

# In-Situ Stabilization/Solidification Pilot Test Results, Operable Unit 8, American Cyanamid Superfund Site, Bridgewater, New Jersey

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DATE: September 18, 2014

## Background

As part of the focused feasibility study (FFS) for Operable Unit 8 (OU8) (i.e. Impoundments 1 and 2) at the American Cyanamid Superfund Site in Bridgewater, New Jersey (Site), a field-scale pilot study was performed on behalf of Wyeth Holdings LLC between August 2013 and July 2014 evaluating two technologies for treating the acid tar within the impoundments. This memorandum summarizes results from the in-situ stabilization/solidification (ISS) portion of the pilot study, one of the two technologies evaluated. In-situ thermal treatment (ISTT) and a combination of ISTT and ISS also were evaluated during the pilot study; however, this memorandum only contains a discussion of the ISS results. Pilot study results summarizing the ISTT portion of the pilot study will be presented separately. Details regarding field implementation of the ISS portion of the study are presented in the *Construction Completion Report* (WRS 2014).

The pilot study focused on acid tar materials within Impoundment 2, which are the residual byproduct of manufacturing benzene, toluene, xylenes, and naphthalene from coal light oil during the 1940s through 1960s. The acid tar is characterized by a low pH (average of 1.5 standard units [SU]) and high concentrations of volatile organic compounds (VOCs), primarily benzene, and semivolatile organic compounds (SVOCs), as well as residual acidity. In addition, a suite of hazardous and malodorous compounds including hydrogen sulfide, sulfur dioxide, mercaptans, and carbon disulfide are present in the material. The acid tar also has distinct physical properties, with two types of material: the viscous rubbery (VR) material is viscous and stringy and the hard and crumbly (HC) material is hard and fibrous. The pilot study was conducted in the northeastern portion of Impoundment 2, which was chosen based on the relatively equal proportions of VR and HC in this area. The contents of Impoundment 2 are similar to that in Impoundment 1, except Impoundment 2 has a higher proportion of VR material and Impoundment 1 has some inert composition from past remediation attempts.

## ISS Pilot Test Background

The pilot study program was developed using results of extensive laboratory testing performed in 2012 and 2013, which evaluated the potential effectiveness of ISTT and ISS on the acid tar within Impoundments 1 and 2. Using the laboratory findings, a pilot study was developed to evaluate potential implementability of ISTT, ISS, and a combination of the two technologies in the field. The pilot study, detailed in the *100 Percent Design of Pilot Study for Operable Unit 8* (CH2M HILL 2013a), was approved by the U.S. Environmental Protection Agency (USEPA) on December 12, 2013. In addition, a number of supporting documents were developed for the pilot study, including:

- *Technical Memorandum Soil Erosion and Sediment Control Plan for Operable Unit 8 Pilot Study* (CH2M HILL 2013b) – Approved by USEPA on August 1, 2012

- *Health and Safety Plan, American Cyanamid Superfund Site, Impoundments 1 and 2, In-Situ Thermal Treatment and In-Situ Stabilization and Solidification, Pilot Study for Operable Unit 8* (CH2M HILL 2013c) – Approved by USEPA on September 12, 2013
- *Waste Management Plan for Operable Unit 8 Impoundments 1 and 2 Pilot Study* (CH2M HILL 2013d) – Approved by USEPA on September 12, 2013
- *Quality Assurance Project Plan Pilot Study for Operable Unit 8* (CH2M HILL 2013e) – Approved by USEPA on November 14, 2013
- *Sampling and Analysis Plan for Operable Unit 8 Pilot Study* (CH2M HILL 2013f) – Approved by USEPA on November 14, 2013
- *Perimeter Air Monitoring Plan for Operable Unit 8 Pilot Study* (CH2M HILL 2013g) – Approved by USEPA on November 14, 2013
- *100 Percent Design of Pilot Study for Operable Unit 8* (CH2M HILL 2013a) – Approved by USEPA on December 12, 2013
- *Site-Specific Work Plan In-Situ Thermal Treatment and In-Situ Stabilization and Solidification* (CH2M HILL 2013h) – Approved by USEPA on December 12, 2013
- *Addendum to Flood Emergency Procedures Plan Impoundments 1 and 2 Pilot Study for Operable Unit 8* (CH2M HILL 2013i) – Approved by USEPA on December 12, 2013
- *Emergency Preparedness and Contingency Plan* (CH2M HILL 2013j) – Approved by USEPA on January 9, 2014

The pilot study commenced in August 2013 with initial activities involving the construction of infrastructure to support the treatment systems. An elevated platform (bench) was constructed along the western side of Impoundment 2 where the treatment equipment was placed to protect it from potential flooding. A floating platform (Flexifloat) was deployed on top of the water surface of Impoundment 2 and anchored using helical screws installed into the subgrade just beyond the outer base of the impoundment berms. This anchoring system was designed to secure the platform against flooding and high, hurricane force winds. The Flexifloat platform was used to suspend three 7-foot-diameter steel caissons with a 9-foot-diameter outer vapor collection shroud, which were placed through the existing water cap and into the impoundment materials. The caissons extended down to the identified clay layer underlying the impoundment materials (approximately 15 feet below the Flexifloat platform) to limit the influx of water and untreated tar into the test cell during treatment. Technologies evaluated in each caisson were:

- Caisson 1 - ISS only
- Caisson 2 – ISTT only
- Caisson 3 - ISTT followed by ISS

This memorandum covers the results of the testing within Caisson 1 (ISS only) and the results of the ISS portion of the study in Caisson 3.

The caissons were fitted with a 9-foot-diameter outer shroud that extended through the existing water cap and into the impoundment materials. This shroud was installed to capture and mitigate potential fugitive emissions from outside the caisson during heating. During ISS, the caissons were fitted with a cover with an access hatch that allowed for the installation of the mixer bar, which was closed after installation to capture vapors in the headspace during and after the ISS operation. Figure 1 illustrates the configuration of the Flexifloat platform and caissons within Impoundment 2. Figures 2 and 3 illustrate the caisson plan including configuration on the Flexifloat platform, schematic of the outer shroud, and cover used during the ISS portion of the pilot study.

Vapors collected in the headspace of the caissons were vented to a thermal oxidizer unit for treatment, followed by a caustic scrubber to reduce the concentration of acid gasses. During the pilot study, the thermal oxidizer was operated at temperatures between 850 and 900 degrees Celsius (approximately 1,550 to 1,650 degrees Fahrenheit).

After an approximately 84-day heating period, the thermal treatment heating operations were concluded on May 9, 2014, and the in-situ thermal heaters were shut down and removed from Caissons 2 and 3. After breakdown of the ISTT system and mobilization of the ISS unit, neutralization and ISS operations were performed on May 29, 2014 (Caisson 3) and May 30, 2014 (Caisson 1). After an approximately 7-day initial curing period, the treated materials were removed from the caissons (June 4, 2014) and placed within separate open-top roll-off containers. On June 5, 2014, supplemental pozzolan reagents and water were added to the rolloff containers for secondary stabilization, in accordance with the pilot study work plan (CH2M HILL 2013h). Samples were collected for laboratory analysis of chemical and physical properties before ISS, immediately following ISS, and after removing the treated acid tar in the rolloff containers (before and after adding stabilization/solidification amendments).

## ISS Operation

The ISS operation was a multistep process that varied depending upon whether the acid tars had been pretreated with ISTT. The first step involved homogenization followed by adding neutralization agents to increase the pH of the acid tar to at least 8 SU. Clay and/or pozzolans were then added to stabilize and solidify the material. The auger-based ISS soil mixing equipment consisted of a Bauer BG 28H rotary drill rig mounted on a BS 80B base carrier, a hollow-stem Kelly bar, and a 6-foot-diameter auger/mixing tool. Injection ports on the mixing auger were used to deliver materials to the caissons in a slurry form. In Caisson 1, dry clay compounds were added through the opened caisson lids. The mixes used for each of the two caissons were based on extensive laboratory testing and optimization of the materials.

The intent of the multistep process was to initially stabilize the material in-situ to create a soil-like matrix and competent operation bench that could support mixing equipment during full-scale remediation. After the initial curing period, the ISS-treated material also would be suitable for excavation and subsequent ex-situ stabilization/solidification. Below are the details of the ISS operations that occurred in Caissons 1 and 3, followed by the excavation and secondary stabilization/solidification activities.

### Caisson 1

Before the ISS operation, a pH buffering slurry of hydrated lime was mixed in a temporary grout plant, which was located near the southwestern corner of Impoundment 2. A total of 1,150 pounds of hydrated lime was prepared with 350 gallons of water, pumped to the mixing auger, and delivered into the acid tar material using nozzles on the mixing auger. Once completed, 7,680 pounds of Partac clay, 5,200 pounds of Lafarge NewCem, and 3,460 pounds of OMNI fluidized bed combustion ash were manually added to the neutralized material. These reagents were pre-blended in super-sacks and added in a controlled manner through an opening in the caisson cover.

### Caisson 3

Because of the resultant hardening of the acid tar following ISTT operations, a pH buffering slurry (4,020 pounds of high calcium lime kiln dust and 480 gallons of water) was added to increase the pH and help dissolve the hardened tar. The slurry was mixed in the temporary batch mixing plant and pumped to the mixing auger via the Kelly bar. Once the pH buffering step was completed, 2,140 pounds of Lafarge NewCem pozzolan reagent and 380 gallons of water were pumped to the mixing auger, and delivered into the acid tar material using nozzles on the mixing auger.

### Material Removal

After curing for approximately 7 days, a 6-foot-diameter drop-bottom bucket auger was used to excavate the stabilized/solidified material from Caissons 1 and 3, and transfer treated materials to two unlined rolloff

containers (a separate rolloff for each caisson). The rolloff containers were placed on the Flexifloat platform immediately adjacent to the caissons during the transfer. During removal, Rusmar odor neutralizing foam was used to control odors and emissions. After placing the material in the rolloff containers, the containers were covered with a tight-fitting tarp.

## Secondary Mixing

As previously discussed, the intention of the ISS step was to create more of a soil-like matrix that subsequently could be excavated. Supplemental ex-situ stabilization/solidification was performed in unlined rolloff containers to increase the unconfined compressive strength (UCS). A slurry prepared using 400 gallons of water and 3,940 pounds of Portland cement was pumped into the Caisson 1 rolloff container and mixed using a Komatsu PC360 excavator bucket. For Caisson 3, 2,680 pounds of dry Portland cement were mixed into the Caisson 3 rolloff container; dry cement was used rather than a slurry because of the moist conditions of the Caisson 3 material. Care was taken to prevent spillage and damage to the rolloff containers during supplemental pozzolan mixing operations, and Rusmar odor neutralizing foam was used to control odors and emission during the mixing. After secondary stabilization/solidification, the treated materials (which resembled a stiff pasty clay) were transferred to lined rolloff containers to better contain the material for transportation offsite. The rolloff containers were covered with a tight-fitting tarp and moved to the concrete pad north of the former Building 78 for temporary storage before shipment offsite to treatment and disposal facilities.

A summary of the amendments added to the each caisson in-situ and after material removal is presented in Table 1.

## Treated Tar Analytical Results

Material samples were collected at various times throughout the ISS process, including before and after in-situ mixing (in caisson), after removing the material, and after additional ex-situ stabilization. Samples were analyzed for VOCs (standard, toxicity characteristic leaching procedure [TCLP], and standard precipitation leaching procedure [SPLP]), SVOCs (standard, TCLP, and SPLP), metals (standard, TCLP, and SPLP), and/or various physical characteristics (pH, moisture content, bulk density, dry density, UCS, hydraulic conductivity, and loss on ignition). Sampling and analysis was conducted in accordance with the USEPA-approved sampling and analysis plan (CH2M HILL 2013h) and May 2014 sampling and analysis plan addendum (CH2M HILL 2014).

The following samples were collected from each caisson:

- Caisson 1 (ISS Only): Two raw tar samples were collected in November 2013. Six additional raw tar samples were collected in May 2014 to supplement the two previously collected baseline samples, which showed significant variability of VOC concentrations based on two sample points. Two post-ISS samples (in caisson) were collected in May 2014 and two post-removal samples (from rolloff container) and two post-secondary stabilization samples (from rolloff container) were collected in June 2014.
- Caisson 3 (ISTT/ISS): Two raw tar samples were collected in November 2013. Nine post-ISTT samples and two post-ISS samples (in caisson) were collected in May 2014. Two post-removal samples (from rolloff container) and two post-secondary stabilization samples (from rolloff container) were collected in June 2014.

## Chemical Analytical Results

### Benzene, Total Volatile Organic Compounds, and Naphthalene

Chemical analytical results for Caissons 1 and 3 are presented in Tables 2 and 3, respectively. Table 4 is a summary of the data, showing average concentrations and standard deviation values for benzene, total volatile organic compounds (TVOCs), and naphthalene for Caissons 1 and 3. The majority of the other VOCs making up the TVOC concentration are other aromatic compounds such as toluene and xylene. To assess performance, benzene, TVOCs, and naphthalene (not included in the TVOC value) data are discussed

because these are the most significant constituents in the acid tar. Bar graphs showing changes in average concentration of benzene, TVOCs, and naphthalene for Caissons 1 and 3 are presented on Figures 4 and 5, respectively; the average concentrations are presented by unit operation (such as pre-treatment [raw tar], post-ISTT, post-first mix, post-removal, post-second mix).

The average benzene concentrations in the raw tar samples from Caissons 1 and 3 were approximately 66,000 milligrams per kilogram (mg/kg), with an average TVOC concentration of 86,000 mg/kg. The naphthalene concentrations in the raw tar samples from Caissons 1 and 3 were 24,600 mg/kg and 9,960 mg/kg, respectively.

The largest decrease in benzene and TVOC concentrations occurred as a result of ISTT. Nine post-ISTT samples were collected from Caisson 3 at various depth intervals, and eight of the nine samples showed a significant decrease in concentrations. The benzene and TVOC concentrations in the eight post-ISTT samples ranged from 19 to 308 mg/kg (benzene) and 34 to 1,096 mg/kg (TVOC). The outlier sample, which was collected at depth from a zone that was shown to be ineffectively heated (discussed in detail in the *In-Situ Thermal Treatment Pilot Study Final Report* [TerraTherm 2014]), had concentrations of 61,900 mg/kg (benzene) and 76,502 mg/kg (TVOC), similar to the raw tar analytical results.

The post-ISTT treated material in Caisson 3 was augured/blended and mixed with ISS amendments. Therefore, to evaluate ISS performance in Caisson 3, it is appropriate to average in the “outlier” with the samples where more effective treatment was observed. The average post-ISTT benzene and TVOC concentrations in Caisson 3, including the outlier of untreated material, were approximately 7,000 mg/kg and 8,800 mg/kg, respectively. The post-ISTT average naphthalene concentration for Caisson 3 was 1,388 mg/kg.

As previously described, both the untreated material in Caisson 1 and the ISTT-treated material in Caisson 3 were mixed in-situ with different quantities of various pH buffering and stabilization/solidification amendments. The ISS-treated material from both caissons (labeled as “Post 1<sup>st</sup> Mix” on Figures 4 and 5) were sampled in-situ and then excavated and placed in separate rolloff containers. The materials in the rolloff containers were sampled (labeled as “Post Removal” on Figures 4 and 5) and additional stabilization/solidification amendments were blended in as previously described. After stabilization/solidification mixing in the rolloff containers, post-second mix samples were collected from each rolloff container.

As shown on Figures 4 and 5, the addition of stabilization agents did little to reduce benzene, TVOC, and naphthalene concentrations. The final average benzene and TVOC concentrations in the Caisson 1 (ISS only) samples were approximately an order of magnitude higher than those in the Caisson 3 (ISTT and ISS) samples (16,800 mg/kg [benzene] and 21,360 mg/kg [TVOC] in Caisson 1 vs. 2,490 mg/kg [benzene] and 3,543 mg/kg [TVOC] in Caisson 3). Naphthalene concentrations in Caisson 1 (3,550 mg/kg) were more than double those in Caisson 3 (1,740 mg/kg).

### TCLP and SPLP

Benzene TCLP and SPLP results are summarized in Table 4, and TCLP and SPLP results are presented in Tables 5 and 6, respectively. Benzene TCLP and SPLP results are presented graphically on Figure 6 (Caisson 1) and Figure 7 (Caisson 3).

The raw tar samples from both caissons had elevated benzene TCLP and SPLP results, with concentrations ranging from 400 to 550 milligrams per liter (mg/L). As observed with the previously discussed data, the largest reductions in benzene TCLP and SPLP concentrations were associated with thermal treatment of Caisson 3. Six post-ISTT samples from Caisson 3 were submitted for TCLP and SPLP analyses. Four of the six samples had TCLP concentrations below the 0.5 mg/L “hazardous characteristic” criterion, with concentrations ranging from less than 0.08 mg/L to 0.45 mg/L (three orders of magnitude reduction in concentrations). Two of the samples had benzene TCLP concentrations of approximately 3 and 12 mg/L.

As previously described, ISTT-treated materials in Caisson 3 were blended in-situ with pozzolans to generate a more soil-like matrix that could be excavated. Therefore, to evaluate ISS data, it is appropriate to average

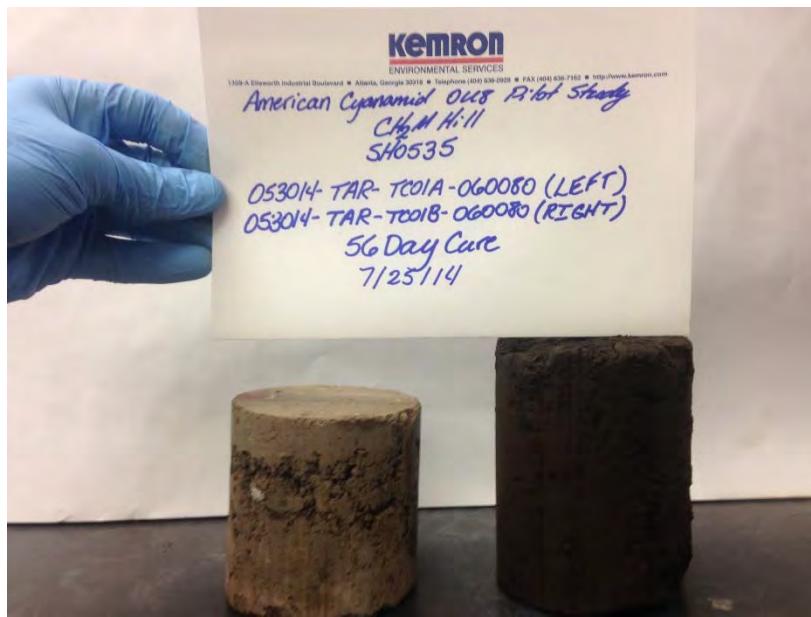
the post-ISTT TCLP and SPLP results. The average benzene TCLP and SPLP concentrations in Caisson 3 increased after in-situ blending of the pozzolans (Post 1<sup>st</sup> Mix data on Figure 7), likely because of homogenization of areas that were not treated as well with ISTT. TCLP and SPLP results following excavation and secondary stabilization are presented on Figures 6 and 7. As expected, the addition of stabilization agents did little to reduce benzene TCLP and SPLP concentrations as their use is to increase the material's compressive strength and reduce permeability.

## Physical Analytical Results

Samples of treated materials from Caissons 1 and 3 were collected and analyzed for various physical parameters. Physical testing results are presented in Table 7. The discussion below focusses on UCS and how the various treatment steps affected the strength of the tar materials. When stabilization amendments were added, UCS measurements were collected after 28 days and 56 days of curing.

Based on physical tests conducted previously on raw acid tars, the raw acid tar has a UCS of 0 psi. The two samples of thermally treated materials collected from Caisson 3 showed an improvement in strength, with UCS results of approximately 9 and 56 psi. The addition of ISS reagents to Caissons 1 and 3 also resulted in increasing strength, with the UCS ranging from 63 to 249 psi (higher strength in the 56-day samples). Following secondary ex-situ stabilization/solidification, the UCS of Caisson 1 materials was lower than expected (16 to 34 psi), and those for Caisson 3 were 198 to 225 psi.

As mentioned, the UCS results for Caisson 1 materials following ISS (Sample 053014-TAR-TC01A; 121 to 249 psi) were higher than the UCS results following ex-situ stabilization/solidification (Sample 060514-TAR-TC01B; 16 to 34 psi). The post-ISS TCO1A samples were well solidified, cured, and resulted in higher UCS values. The post-ex-situ stabilization/solidification TCO1B samples were not well solidified and were soft (tar-like) and crumbly. The photograph below shows the 56-day samples for the post-ISS sample (on the left) and the post-ex-situ stabilization/solidification sample (on the right). The appearance of the 56-day samples are comparable to the 28-day samples.



## Ambient Air Sampling Results

Real-time air monitoring was conducted during the pilot study from ten locations within two zones, as described below:

- Zone 1: Five real-time monitoring locations in the work area (Flexifloat platform, elevated bench, and impoundment berms)

- Zone 2: Five real-time stations at the perimeter of the site or near adjacent receptors

Each location was equipped with real-time monitoring equipment for VOCs using a photoionization detector (PID) and sulfur-bearing compounds using a Jerome Meter. Each Zone 1 station also was equipped with a unit to perform benzene speciation if the TVOC concentration was detected greater than defined notification levels (defined below). The air monitoring program used Greenlight, a proprietary computer-based environmental monitoring system, which used wireless telemetry to relay field measurements, in real-time, to a database. Along with the real-time monitoring, sampling for laboratory analysis was performed once every 3 weeks at key stations and at certain locations where elevated readings were observed to be associated with pilot study operations.

As outlined in the *Perimeter Air Monitoring Plan* (CH2M HILL 2013g), two concentration thresholds were established for VOCs and reduced sulfur that required response actions.

- Notification Level - This level was set at 1 part per million by volume (ppmv) for benzene and 100 parts per billion by volume (ppbv) for reduced sulfur, and was established to confirm the source and determine if the excursion was related to pilot study activities.
- Action Levels – This level was set at 3 ppmv for benzene and 800 ppbv for reduced sulfur, and is the level that required actions related to the pilot study, including evaluating system equipment for leaks and even the potential shutdown of the ISTT pilot study if issues could not be corrected within the specified timeframes.

During ISS operation, action levels were exceeded twice in Zone 1 that were associated with pilot study operations. There were no action levels triggered at the outer Zone 2 monitoring stations attributable to the pilot study operations. The Zone 1 action level events occurred on May 30, 2014, and June 4, 2014, at station C5 (on the Flexifloat platform):

- The May 30, 2014, event occurred when the auger was removed from Caisson 1 following ISS mixing. The reading was confirmed with a handheld detector, a bottlevac sample (for VOC) was collected, the auger was covered with polysheeting, and Rusmar foam was applied to the surface of impoundment material in Caisson 1.
- The June 4, 2014, event occurred as impoundment material was being excavated from Caisson 1 and placed into a rolloff container. The reading was confirmed with a handheld detector, and a bottlevac sample was collected. Rusmar foam was applied to the surface of impoundment material as material was placed in the rolloff container.

The field teams upgraded to Level C personnel protective equipment, as appropriate, based on site data. During the remainder of the ISS operations, no other action levels were observed to be associated with the pilot study, however elevated readings were observed occasionally during the monitoring period.

## References

CH2M HILL. 2013a. *100 Percent Design of Pilot Study for Operable Unit 8 – American Cyanamid Superfund Site*. October 25.

CH2M HILL. 2013b. *Draft Technical Memorandum Soil Erosion and Sediment Control Plan for Operable Unit 8 Pilot Study, American Cyanamid Superfund Site*. July 10.

CH2M HILL. 2013c. *Health and Safety Plan, American Cyanamid Superfund Site, Impoundments 1 and 2, In-Situ Thermal Treatment and In-Situ Stabilization and Solidification, Pilot Study for Operable Unit 8*. August.

CH2M HILL. 2013d. *Waste Management Plan for Operable Unit 8 Impoundments 1 and 2 Pilot Study - American Cyanamid Superfund Site*. August 19.

CH2M HILL. 2013e. *Quality Assurance Project Plan Pilot Study for Operable Unit 8 American Cyanamid Superfund Site*. October 11.

CH2M HILL. 2013f. *Sampling and Analysis Plan for Operable Unit 8 Pilot Study - American Cyanamid Superfund Site.* October 18.

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CH2M HILL. 2013h. *Site-Specific Work Plan In-Situ Thermal Treatment and In-Situ Stabilization and Solidification, Pilot Study for Operable Unit 8 American Cyanamid Superfund Site.* November 27.

CH2M HILL. 2013i. *Addendum to Flood Emergency Procedures Plan Impoundments 1 and 2 Pilot Study for Operable Unit 8 - American Cyanamid Superfund Site.* November 27.

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TerraTherm. 2014. *In-Situ Thermal Treatment Pilot Study Final Report, American Cyanamid Superfund Site.* September 8.

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## **Tables**

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TABLE 1

**Summary of ISS Amendments***In-Situ Stabilization/Solidification Pilot Test Results, Operable Unit 8**American Cyanamid Superfund Site, Bridgewater, New Jersey*

	<b>Caisson 1</b>	<b>Caisson 3</b>
<b>Pretreatment:</b>	None	ISTT
<b>Neutralization:</b>	1,150 pounds hydrated lime	4,020 pounds high calcium lime kiln dust
<b>Amendment 1:</b>	7,680 pounds Partac clay	2,140 pounds Lafarge NewCem
<b>Amendment 2:</b>	5,200 pounds Lafarge NewCem	--
<b>Amendment 3:</b>	3,460 pounds OMNI fluidized bed combustion ash	--
<b>Post-Excavation:</b>	3,940 pounds Portland cement	2,680 pounds Portland cement
<b>Comments:</b>	Portland cement added post-excavation to increase compressive strength	Portland cement added post-excavation to increase compressive strength
<b>Total Mass of Additives (excluding water):</b>	21,430 pounds	8,840 pounds

Table 2 - Caisson #1  
 OU 8 Pilot Study ISS Memorandum  
 American Cyanamid Superfund Site  
 Bridgewater, NJ

Impoundment Xtab - Normal Results

Location		CAISSON #1										ROLL OFF		6/5/2014					
Sample Date		11/21/2013		5/20/2014						5/30/2014		6/4/2014		6/5/2014					
Treatment Stage		Pre-ISS (Raw Tar)										POST 1st MIX		Post Removal (Post 1st, Pre 2nd)		POST 2nd MIX			
Core/Depth		0-1.2'		0-1.2'		A - 0-0.8'		A - 0.8-2.6'		A - 2.6-5.3'		B - 0-0.1'		B - 1.9-2.7'		B - 4.2-5.6'			
Parameter	Unit	112113-TAR-TC01 0012 (Encore)	112113-TAR-TC01 0012 (Terracore)	052014-VR- TC01A-000008	052014-INT- TC01A-008026	052014-HC- TC01A-026053	052014-VR- TC01B-000001	052014-INT- TC01B-019027	052014-HC- TC01B-042056	5/30/2014	A - 6-8'	B - 6-8'	6/4/2014	NA	NA	N/A	6/5/2014	060514-TAR- TC01B	060514-TAR- TC01B-D
VOCs																			
1,1,1-TRICHLOROETHANE	ug/kg	< 9760	54200 J	< 40000	< 43000	< 4600	4670 J	< 110000	< 110000	< 7000	< 8100	460 J	424 J	--	< 3700	< 840			
1,1,2-TETRACHLOROETHANE	ug/kg	--	< 9700	< 47000	< 51000	< 5500	< 3900	< 130000	< 130000	< 8300	< 9600	< 410	< 390	--	< 4400	< 1000			
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/kg	< 22400	< 20700	< 60000	< 65000	< 7000	< 4900	< 170000	< 160000	< 11000	< 12000	< 520	< 500	--	< 5600	< 1300			
1,1,2-TRICHLOROETHANE	ug/kg	< 3860	< 3560	< 110000	< 120000	< 13000	< 9200	< 310000	< 300000	< 20000	< 23000	< 970	< 950	--	< 11000	< 2400			
1,1-DICHLOROETHANE	ug/kg	< 5810	< 5350	< 43000	< 47000	< 5000	< 3500	< 120000	< 110000	< 7700	< 8800	< 370	< 360	--	< 4100	< 920			
1,1-DICHLOROETHENE	ug/kg	< 13700	< 12600	< 40000	< 43000	< 4600	< 3200	< 110000	< 110000	< 7000	< 8100	< 340	< 330	--	< 3700	< 840			
1,2,3-TRICHLOROBENZENE	ug/kg	< 21700	< 20000	< 29000	< 31000	< 3300	< 2300	< 79000	< 76000	< 5000	< 5800	< 250	< 240	--	< 2700	< 600			
1,2,4-TRICHLOROBENZENE	ug/kg	< 18400	316,000	< 25000	< 27000	< 2900	< 2000	< 69000	< 66000	< 4400	< 5100	< 210	1440 J	--	< 2300	< 530			
1,2-DIBROMO-3-CHLOROPROPANE	ug/kg	< 17200	< 15800	< 180000	< 200000	< 21000	< 15000	< 510000	< 490000	< 32000	< 37000	< 1600	< 1500	--	< 17000	< 3900			
1,2-DIBROMOETHANE (ETHYLENE DIBROMIDE)	ug/kg	< 12400	< 11400	< 76000	< 82000	< 8800	< 6200	< 210000	< 200000	< 13000	< 15000	< 650	< 630	--	< 7100	< 1600			
1,2-DICHLOROBENZENE	ug/kg	2,050,000	1850000 J	2,430,000	5,700,000	486,000	2,250,000	1110000 J	449000 J	686,000	831,000	814,000	722,000	--	517,000	498,000			
1,2-DICHLOROETHANE	ug/kg	< 11900	< 11000	< 44000	< 48000	< 5100	< 3600	< 120000	< 120000	< 7800	< 9000	< 380	< 370	--	< 4100	< 940			
1,2-DICHLOROPROPANE	ug/kg	< 4590	< 4230	< 60000	< 65000	< 7000	< 4900	< 170000	< 160000	< 11000	< 12000	< 520	< 500	--	< 5600	< 1300			
1,3-DICHLOROBENZENE	ug/kg	33700 J	296,000	36000 J	76600 J	7530 J	38300 J	< 83000	< 80000	9910 J	12600 J	12,200	11,400	--	7520 J	7640 J			
1,4-DICHLOROBENZENE	ug/kg	154000 J	1,630,000	203000 J	456000 J	40100 J	220,000	< 95000	< 92000	55700 J	66700 J	67,800	63,200	--	44200 J	43,400			
1,4-DIOXANE (P-DIOXANE)	ug/kg	--	--	< 11000000	< 11000000	< 1200000	< 860000	< 29000000	< 28000000	< 1900000	< 2100000	< 91000	< 88000	--	< 990000	< 220000			
2-HEXANONE	ug/kg	< 17800	< 16400	< 250000	< 270000	< 28000	< 20000	< 680000	< 650000	< 43000	< 50000	< 2100	< 2100	--	< 23000	< 5200			
ACETONE	ug/kg	72600 J	305000 J	< 630000	< 680000	309,000	< 51000	< 1700000	< 1700000	< 110000	< 130000	61,300	55,800	--	< 59000	55,700			
BENZENE	ug/kg	50,500,000	335,000,000	43,800,000	140,000,000	62,400,000	36,000,000	70,100,000	55,800,000	18,600,000	28,300,000	27,600,000	20,700,000	--	16,800,000	13,200,000			
BROMOCHLOROMETHANE	ug/kg	< 20000	< 18400	< 72000	< 78000	< 8300	< 5800	< 200000	< 190000	< 13000	< 15000	< 620	< 600	--	< 6700	< 1500			
BROMODICHLOROMETHANE	ug/kg	< 6240	< 5750	< 39000	< 42000	< 4500	< 3200	< 110000	< 100000	< 6800	< 7900	< 330	< 320	--	< 3600	< 820			
BROMOFORM	ug/kg	< 26300	< 24300	< 36000	< 39000	< 4200	< 3000	< 100000	< 96000	< 6400	< 7400	< 310	< 300	--	< 3400	< 760			
BROMOMETHANE	ug/kg	< 29300	< 27000	< 66000	< 72000	< 7700	< 5400	< 180000	< 180000	< 12000	< 14000	< 570	< 560	--	< 6200	< 1400			
CARBON DISULFIDE	ug/kg	< 11300	435,000	53700 J	154000 J	< 2300	55200 J	< 54000	< 52000	< 3400	< 4000	1030 J	1250 J	--	< 1800	< 410			
CARBON TETRACHLORIDE	ug/kg	< 11400	< 10500	< 35000	< 38000	< 4000	< 2800	< 95000	< 92000	< 6100	< 7100	< 300	< 290	--	< 3200	< 730			
CHLOROBENZENE	ug/kg	20500 J	152000 J	< 27000	< 30000	< 3100	16600 J	< 75000	< 72000	< 4800	< 5500	3900 J	3620 J	--	< 2500	2530 J			
CHLOROETHANE	ug/kg	< 12100	< 11200	< 140000	< 150000	< 16000	< 11000	< 380000	< 360000	< 24000	< 28000	< 1200	< 1100	--	< 13000	< 2900			
CHLOROFORM	ug/kg	< 10400	< 9580	< 35000	< 38000	< 4100													

Table 2 - Caisson #1  
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Impoundment Xtab - Normal Results

Location		CAISSON #1										ROLL OFF		6/5/2014				
Sample Date		11/21/2013		5/20/2014						5/30/2014		6/4/2014		6/5/2014				
Treatment Stage		Pre-ISS (Raw Tar)										POST 1st MIX		Post Removal (Post 1st, Pre 2nd)		POST 2nd MIX		
Core/Depth		0-1.2'	0-1.2'	A - 0-0.8'	A - 0.8-2.6'	A - 2.6-5.3'	B - 0-0.1'	B - 1.9-2.7'	B - 4.2-5.6'	5/30/2014	6/4/2014	NA	NA	N/A	NA	NA		
Parameter	Unit	112113-TAR-TC01 0012 (Encore)	112113-TAR-TC01 0012 (Terracore)	052014-VR- TC01A-000008	052014-INT- TC01A-008026	052014-HC- TC01A-026053	052014-VR- TC01B-000001	052014-INT- TC01B-019027	052014-HC- TC01B-042056	5/30/2014	6/4/2014	053014-PTM- TC01A-060080	053014-PTM- TC01B-060080	060414-TAR- TC01A	060414-TAR- TC01A-D	060414-TAR- TC01B	060514-TAR- TC01B	060514-TAR- TC01B-D
<b>SVOCs</b>																		
1,2,4,5-TETRACHLOROBENZENE	ug/kg	--	< 43600	--	--	--	--	--	--	< 78	< 84	< 160	< 160	--	< 170	< 170		
2,2-OXYBIS(2-CHLOROPROpane)	ug/kg	--	--	--	--	--	--	--	--	< 76	< 81	< 150	< 160	--	< 170	< 160		
2,3,4,6-TETRACHLOROPHENOL	ug/kg	--	< 55100	--	--	--	--	--	--	< 260	< 280	< 530	< 550	--	< 590	< 560		
2,4,5-TRICHLOROPHENOL	ug/kg	--	< 55600	--	--	--	--	--	--	< 300	< 320	< 600	< 620	--	< 660	< 630		
2,4,6-TRICHLOROPHENOL	ug/kg	--	< 62000	--	--	--	--	--	--	< 240	< 260	< 480	< 500	--	< 540	< 510		
2,4-DICHLOROPHENOL	ug/kg	--	< 50700	--	--	--	--	--	--	< 410 J	< 440 J	< 830	< 860	--	< 920	< 870		
2,4-DIMETHYLPHENOL	ug/kg	--	< 34900	--	--	--	--	--	--	< 430 J	< 460 J	< 860	< 890	--	< 960	< 910		
2,4-DINITROPHENOL	ug/kg	--	< 120000	--	--	--	--	--	--	< 310	< 330	< 630	< 650	--	< 690	< 660		
2,4-DINITROTOLUENE	ug/kg	--	< 35900	--	--	--	--	--	--	< 110	< 120	< 220	< 230	--	< 250	< 240		
2,6-DINITROTOLUENE	ug/kg	--	< 65800	--	--	--	--	--	--	< 97	< 100	< 200	< 200	--	< 220	< 210		
2-CHLORONAPHTHALENE	ug/kg	--	< 56200	--	--	--	--	--	--	< 79	< 84	< 160	< 160	--	< 180	< 170		
2-CHLOROPHENOL	ug/kg	--	< 38700	--	--	--	--	--	--	< 260	< 270	< 510	< 530	--	< 570	< 540		
2-METHYLNAPHTHALENE	ug/kg	--	1390000 J	--	--	--	--	--	--	--	246,000	222,000	209,000	--	194,000	166,000		
2-METHYLPHENOL (O-CRESOL)	ug/kg	--	< 54600	--	--	--	--	--	--	< 290	< 310	< 590	< 610	--	< 650	< 610		
2-NITROANILINE	ug/kg	--	< 22400	--	--	--	--	--	--	< 110	< 120	< 230	< 230	--	< 250	< 240		
2-NITROPHENOL	ug/kg	--	< 63100	--	--	--	--	--	--	< 270 J	< 290 J	< 550	< 560	--	< 600	< 570		
3- AND 4- METHYLPHENOL (TOTAL)	ug/kg	--	--	--	--	--	--	--	--	< 320	< 350	< 650	< 670	--	< 720	< 680		
3,3'-DICHLOROBENZIDINE	ug/kg	--	< 169000	--	--	--	--	--	--	< 65	< 69	< 130	< 130	--	< 140	< 140		
3-NITROANILINE	ug/kg	--	< 24000	--	--	--	--	--	--	< 100	< 110	< 210	< 210	--	< 230	< 220		
4,6-DINITRO-2-METHYLPHENOL	ug/kg	--	< 95200	--	--	--	--	--	--	< 310	< 330	< 630	< 650	--	< 690	< 660		
4-BROMOPHENYL PHENYL ETHER	ug/kg	--	< 56200	--	--	--	--	--	--	< 93	< 99	< 190	< 190	--	< 210	< 200		
4-CHLORO-3-METHYLPHENOL	ug/kg	--	< 39700	--	--	--	--	--	--	< 260 J	< 270 J	< 510	< 530	--	< 570	< 540		
4-CHLOROANILINE	ug/kg	--	< 33900	--	--	--	--	--	--	< 82 J	< 87 J	< 160	< 170	--	< 180	< 170		
4-CHLOROPHENYL PHENYL ETHER	ug/kg	--	< 39300	--	--	--	--	--	--	< 77	< 82	< 150	< 160	--	< 170	< 160		
4-NITROANILINE	ug/kg	--	< 22700	--	--	--	--	--	--	< 100	< 110	< 200	< 210	--	< 220	< 210		
4-NITROPHENOL	ug/kg	--	< 112000	--	--	--	--	--	--	< 430	< 460	< 870	< 900	--	< 960	< 910		
ACENAPHTHENE	ug/kg	--	267000 J	--	--	--	--	--	--	18,400	50,800	8,600	7,190	--	6,890	6,550		
ACENAPHTHYLENE	ug/kg	--	< 36100	--	--	--	--	--	--	< 82	< 87	< 160	< 170	--	< 180	< 170		
ACETOPHENONE	ug/kg	--	< 52700	--	--	--	--	--	--	242,000	407,000	443,000	418,000	--	313,000	332,000		
ANILINE	ug/kg	--	< 120000	--	--	--	--	--	--	47,300	215,000	138,000 J	170000 J	--	96000 J	83300 J		
ANTHRACENE	ug/kg	--	< 36300	--	--	--	--	--	--	< 89	< 95	< 180	< 190	--	< 200	< 190		
ATRAZINE	ug/kg	--	< 37100	--	--	--	--	--	--	< 50	< 54	< 100	< 100	--	< 110	< 110		
BENZALDEHYDE	ug/kg	--	< 171000	--	--	--	--	--	--	< 59	< 63	< 120	< 120	--	< 130	< 120		
BENZO(A)ANTHRACENE	ug/kg	--	< 32900	--	--	--	--	--	--	< 83	< 89	1,290	< 170	--	< 190	2,430		
BENZO(A)PYRENE	ug/kg	--	< 22100	--	--	--	--	--	--	< 78	< 83	< 160	< 160	--	< 170	815		
BENZO(B)FLUORANTHENE	ug/kg	--	< 34900	--	--	--	--	--	--	< 85	< 91	< 170	< 180	--	< 190	< 180		
BENZO(G,H,I)PERYLENE	ug/kg	--	< 26700	--	--	--	--	--	--	< 95	< 100	< 190	< 200	--	< 210	< 200		
BENZO(K)FLUORANTHENE	ug/kg	--	< 27300	--	--	--	--	--	--	< 96	< 100	< 190	< 200	--	< 210	< 200		
BENZYL BUTYL PHTHALATE	ug/kg	--	< 35200	--	--	--	--	--	--	< 150	< 160	< 300	< 310	--	< 330	< 310		
BIPHENYL (DIPHENYL)	ug/kg	--	< 26100	--	--	--	--	--	--	13,000	21,300	15,800	15,200	--	14,400	13,100		
BIS(2-CHLOROETHOXY) METHANE	ug/kg	--	< 30800	--	--	--	--	--	--	< 100 J	< 110 J	< 210	< 210	--	&			

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Location		CAISSON #1										ROLL OFF		6/5/2014			
Sample Date		11/21/2013		5/20/2014						5/30/2014		6/4/2014		6/5/2014			
Treatment Stage		Pre-ISS (Raw Tar)										POST 1st MIX		Post Removal (Post 1st, Pre 2nd)			
Core/Depth		0-1.2'	0-1.2'	A - 0-0.8'	A - 0.8-2.6'	A - 2.6-5.3'	B - 0-0.1'	B - 1.9-2.7'	B - 4.2-5.6'	5/30/2014		A - 6-8'	B - 6-8'	6/4/2014			
Parameter	Unit	112113-TAR-TC01 0012 (Encore)	112113-TAR-TC01 0012 (Terracore)	052014-VR- TC01A-000008	052014-INT- TC01A-008026	052014-HC- TC01A-026053	052014-VR- TC01B-000001	052014-INT- TC01B-019027	052014-HC- TC01B-042056	5/30/2014		053014-PTM- TC01A-060080	053014-PTM- TC01B-060080	6/4/2014		6/5/2014	
HEXACHLOROBENZENE	ug/kg	--	< 68500	--	--	--	--	--	--	< 83	< 89	< 170	< 170	< 190	< 180		
HEXACHLOROBUTADIENE	ug/kg	--	< 46700	--	--	--	--	--	--	< 71 J	< 76 J	< 140	< 150	< 160	< 150		
HEXACHLOROCYCLOPENTADIENE	ug/kg	--	< 374000	--	--	--	--	--	--	< 260	< 280	< 520	< 540	< 580	< 550		
HEXACHLOROETHANE	ug/kg	--	< 84000	--	--	--	--	--	--	< 71	< 76	< 140	< 150	< 160	< 150		
INDENO(1,2,3-C,D)PYRENE	ug/kg	--	< 42500	--	--	--	--	--	--	< 89	< 94	< 180	< 180	< 200	< 190		
ISOPHORONE	ug/kg	--	< 31400	--	--	--	--	--	--	< 69 J	< 73 J	< 140	< 140	< 150	< 140		
M,P-CRESOL	ug/kg	--	< 66300	--	--	--	--	--	--	--	--	--	--	--	--		
NAPHTHALENE	ug/kg	--	24,600,000	--	--	--	--	--	--	2,740,000	4,010,000	4,340,000	4,000,000	3,550,000	3,340,000		
NITROBENZENE	ug/kg	--	< 92000	--	--	--	--	--	--	< 74 J	< 79 J	< 150	< 150	< 160	< 160		
N-NITROSODI-N-PROPYLAMINE	ug/kg	--	< 77000	--	--	--	--	--	--	< 62	< 66	< 130	< 130	< 140	< 130		
N-NITROSODIPHENYLAMINE	ug/kg	--	< 37300	--	--	--	--	--	--	< 150	< 160	< 310	< 320	< 340	< 320		
PENTACHLOROPHENOL	ug/kg	--	< 39500	--	--	--	--	--	--	< 440	< 470	< 880	< 910	< 970	< 920		
PHENANTHRENE	ug/kg	--	< 40500	--	--	--	--	--	--	19,600	22,700	38,200	39,400	33,400	36,300		
PHENOL	ug/kg	--	< 48700	--	--	--	--	--	--	< 270	< 290	< 540	< 560	< 600	< 570		
PYRENE	ug/kg	--	< 24800	--	--	--	--	--	--	< 98	< 100	1,000	797	647	4,130		
PCBs																	
PCB, TOTAL	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
PCB-1016 (AROCLOR 1016)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	< 23 J	--		
PCB-1221 (AROCLOR 1221)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	< 30	--		
PCB-1232 (AROCLOR 1232)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	< 34 J	--		
PCB-1242 (AROCLOR 1242)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	< 24 J	--		
PCB-1248 (AROCLOR 1248)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	< 22	--		
PCB-1254 (AROCLOR 1254)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	< 22 J	--		
PCB-1260 (AROCLOR 1260)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	< 18 J	--		
PCB-1268 (AROCLOR 1268)	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	< 14 J	--		
Metals																	
ALUMINUM	mg/kg	--	316	--	--	--	--	--	--	--	--	--	--	--	15,600		
ANTIMONY	mg/kg	--	< 1.07	--	--	--	--	--	--	--	--	--	--	--	1.2 J		
ARSENIC	mg/kg	--	< 1.4	--	--	--	--	--	--	--	--	--	--	--	14		
BARIUM	mg/kg	--	10	--	--	--	--	--	--	--	--	--	--	--	134		
BERYLLIUM	mg/kg	--	< 0.071	--	--	--	--	--	--	--	--	--	--	--	1		
CADMIUM	mg/kg	--	< 0.089	< 0.011	< 0.011	< 0.014	< 0.011	< 0.014	< 0.015	< 0.048	< 0.052	< 0.049	< 0.051	< 0.055	--		
CALCIUM	mg/kg	--	745	--	--	--	--	--	--	--	--	--	--	--	144,000		
CHROMIUM, TOTAL	mg/kg	--	11	--	--	--	--	--	--	--	--	--	--	--	23		
COBALT	mg/kg	--	1	--	--	--	--	--	--	--	--	--	--	--	5.5 J		
COPPER	mg/kg	--	60	1	49	5	1	8	5	10	14	3	5	--	5		
IRON	mg/kg	--	6,270	--	--	--	--	--	--	--	--	--	--	--	12,800		
LEAD	mg/kg	--	142	10	72	41	10	39	28	51	47	40	61	--	42		
MAGNESIUM	mg/kg	--	94	--	--	--	--	--	--	--	--	--	--	--	10,700		
MANGANESE	mg/kg	--	35	--	--	--	--	--	--	--	--	--	--	--	495		
MERCURY	mg/kg	--	1	0	0	0	< 0.0034	0	0	0	0	0	0.0079 J	--	0		
NICKEL	mg/kg	--	16	2	27	6	2	11	10	9	8	8	10	--	9		
POTASSIUM	mg/kg	--	41	--	--	--	--	--	--	--	--	--	--	--	2,940		
SELENIUM	mg/kg	--	8	--	--	--	--	--	--	--	--	--	--	--	5		
SILVER	mg/kg	--	0.19 J	--	--	--	--	--	--	--	--	--	--	--	3		
SODIUM	mg/kg	--	3,210	--	--	--	--	--	--	--	--	--	--	--	4,630		
THALLIUM	mg/kg	--	< 0.36	--	--	--	--	--	--	--	--	--	--	--	< 4		
VANADIUM	mg/kg	--	2	--	--	--	--	--	--	--	--	--	--	--	17		
ZINC	mg/kg	--	36	3	12	4	2	7	10	17	11	14	17	--	77		
AVS/SEM																	
ACID VOLATILE SULFIDE	umol/g	--	0	< 0.09	1	< 0.09	< 0.11	< 0.12		16	0	15	17	--	18		
CADMIUM	umol/g	--	< 0.0016	< 0.0016	< 0.002	< 0.0015	< 0.002	< 0.0021		< 0.0068	< 0.0075	< 0.007	< 0.0072	< 0.0078	--		
COPPER	umol/g	--	0	1	0	0	0	0		0	0	0	0	--	0		

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Location		CAISSON #1										ROLL OFF							
Sample Date		11/21/2013		5/20/2014						5/30/2014		6/4/2014		6/5/2014					
Treatment Stage		Pre-ISS (Raw Tar)										POST 1st MIX		Post Removal (Post 1st, Pre 2nd)		POST 2nd MIX			
Core/Depth	Core/Depth	0-1.2'	0-1.2'	A - 0-0.8'	A - 0.8-2.6'	A - 2.6-5.3'	B - 0-0.1'	B - 1.9-2.7'	B - 4.2-5.6'	5/30/2014	A - 6-8'	B - 6-8'	6/4/2014	NA	NA	N/A	NA	NA	
Parameter	Unit	112113-TAR-TC01-0012 (Encore)	112113-TAR-TC01-0012 (Terracore)	052014-VR-TC01A-000008	052014-INT-TC01A-008026	052014-HC-TC01A-026053	052014-VR-TC01B-000001	052014-INT-TC01B-019027	052014-HC-TC01B-042056	5/30/2014	053014-PTM-TC01A-060080	053014-PTM-TC01B-060080	6/4/2014	060414-TAR-TC01A	060414-TAR-TC01A-D	060414-TAR-TC01B	6/5/2014	060514-TAR-TC01B	060514-TAR-TC01B-D
General Chemistry																			
ACIDITY, TOTAL	mg/kg	--	--	--	--	--	--	--	--	< 50	< 50		--	--	--	< 50	--	--	
ALKALINITY, TOTAL (AS CACO3)	mg/kg	--	--	--	--	--	--	--	--	2,730	1,360		--	--	--	39,500	--	--	
ASHCONTENT	mg/kg	--	--	--	--	--	--	--	--	--	--		--	--	--	< 20	--	--	
BROMIDE	mg/kg	--	--	--	--	--	--	--	--	--	--		--	--	--	1,260	--	--	
CHLORINE	mg/kg	--	--	--	--	--	--	--	--	--	--		--	--	--	12.3 J	--	--	
CORROSIVITY	SU	--	--	--	--	--	--	--	--	--	--		--	--	--	1.8 J	--	--	
CYANIDE	mg/kg	--	--	--	--	--	--	--	--	--	--		--	--	--	1	--	--	
DENSITY	g/cm3	--	--	--	--	--	--	--	--	--	--		--	--	--	112 J	--	--	
FLUORINE	mg/kg	--	--	--	--	--	--	--	--	--	--		--	--	--	2,270	--	--	
GROSS CALORIFIC VALUE	BTU/lb	--	--	--	--	--	--	--	--	--	--		--	--	--	104	--	--	
IGNITABILITY	Degrees F	--	--	--	--	--	--	--	--	--	--		--	--	--	37	--	--	
MOISTURE, PERCENT (D4017)	percent	--	--	--	--	--	--	--	--	--	--		--	--	--	43	--	--	
MOISTURE, PERCENT (D4643)	percent	--	--	--	--	--	--	--	--	--	--		--	--	--	27	--	--	
NITROGEN, AMMONIA (AS N)	mg/kg	--	--	--	--	--	--	--	--	--	--		--	--	--	40	--	--	
OXIDATION-REDUCTION POTENTIAL	mV	--	--	--	--	--	--	--	--	186	58		--	--	--	57	--	--	
PH	ph units	--	--	--	--	--	--	--	--	12	10		--	--	--	44 J	--	--	
SOLIDS, PERCENT	percent	--	--	--	--	--	--	--	--	--	--		--	--	--	40,900	--	--	
SULFIDE	mg/kg	--	--	--	--	--	--	--	--	4	8		--	--	--	210000 J	--	--	
SULFUR, PERCENT	percent	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	
SULFUR, MOL (S8)	mg/kg	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	
TOTAL ORGANIC CARBON	mg/kg	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	

Notes:

-- = no sample taken

BTU/lb = British Thermal Units per pound

g/cm3=grams per cubic centimeter

ug/Kg = micrograms per kilogram

mg/Kg = milligrams per kilogram

umol/g = micromoles per gram

Degree F = Degrees Fahrenheit

mV = milivolt

SU = Standard Units

J = estimated detected result

NA = Not applicable

< = non-detected result

Detects are in **BOLD** font

Table 3 - Caisson #3  
 OU 8 Pilot Study ISS Memorandum  
 American Cyanamid Superfund Site  
 Bridgewater, NJ

Impoundment Xtab - Normal Results

Location		CAISSON #3		2/28/14-5/9/14	CAISSON #3										5/29/2014	6/4/2014	ROLL OFF						
Sample Date		11/21/2013			5/28/2014													6/4/2014					
Treatment Stage		PRE THERMAL (Raw Tar)			POST THERMAL (PRE ISS MIXING)												POST 1st MIX		POST REMOVAL (Pre 2nd MIX)				
Core/Depth		0-1.2' 112113-TAR-TC03-0012 (Encore)			A - 0.8-2.2' 052814-TAR-TC03A-	A - 5-5.8' 052814-SWSM-TC03A-	A - 7-8.2' 052814-HC-TC03A-	B - 0.9-1.6' 052814-HC-TC03B-	B - 5-7.6' 052814-TAR-TC03B-	B - 5-7.6' Dup 052814-TAR-TC03B-050076-	B - 7.6-8' 052814-TAR-TC03B-	C - 4-5' 052814-HC-TC03C-	C - 5-7' 052814-SW-TC03C-	C - 7-8' 052814-HC-TC03C-			Sample A 053014-PTM-TC03A-	Sample B 053014-PTM-TC03B-	6/4/2014	6/4/2014			
Parameter	Unit	112113-TAR-TC03-0012 (Encore)	112113-TAR-TC03-0012		052814-TAR-TC03A-	052814-SWSM-TC03A-	052814-HC-TC03A-	052814-HC-TC03B-	052814-TAR-TC03B-	052814-TAR-TC03B-050076-	052814-TAR-TC03B-	052814-HC-TC03C-	052814-SW-TC03C-	052814-HC-TC03C-			Sample A 060414-TAR-TC03A-	Sample B 060414-TAR-TC03B-	6/4/2014	6/4/2014			
VOCs																							
1,1,1-TRICHLOROETHANE	ug/kg	< 6790	11600 J		< 150	< 150	< 260	< 200	< 45	< 170	< 2700	< 300	< 47	< 220		< 2000	< 2000	< 3300	< 1900	< 470	< 390		
1,1,2,2-TETRACHLOROETHANE	ug/kg	< 7320	< 7230		< 180	< 180	< 310	< 240	< 54	< 200	< 3200	< 360	< 56	< 260		< 2300	< 2400	< 3900	< 2300	< 560	< 460		
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/kg	< 15600	< 15400		< 230	< 230	< 390	< 300	< 69	< 250	< 4100	< 450	< 71	< 340		< 3000	< 3100	< 4900	< 2900	< 720	< 580		
1,1,2-TRICHLOROETHANE	ug/kg	< 2690	< 2650		< 440	< 440	< 730	< 570	< 130	< 480	< 7700	< 850	< 130	< 640		< 5600	< 5800	< 9300	< 5500	< 1400	< 1100		
1,1-DICHLOROETHANE	ug/kg	< 4040	< 3990		< 170	< 170	< 280	< 220	< 50	< 180	< 2900	< 330	< 51	< 240		< 2200	< 2200	< 3600	< 2100	< 520	< 420		
1,1-DICHLOROETHENE	ug/kg	< 9510	< 9390		< 150	< 150	< 260	< 200	< 45	< 170	< 2700	< 300	< 47	< 220		< 2000	< 2000	< 3300	< 1900	< 470	< 390		
1,2,3-TRICHLOROBENZENE	ug/kg	< 15100	< 14900		< 110	< 110	< 190	< 140	< 33	< 120	< 1900	< 220	< 34	< 160		< 1400	< 1500	< 2300	< 1400	< 340	< 280		
1,2,4-TRICHLOROBENZENE	ug/kg	< 12800	< 12600		997 J	430 J	512 J	< 130	< 29	< 110	< 1700	< 190	< 30	< 140		< 1200	< 1300	< 2100	< 1200	< 300	< 240		
1,2-DIBROMO-3-CHLOROPROPANE	ug/kg	< 11900	< 11800		< 720	< 700	< 1200	< 920	< 210	< 770	< 12000	< 1400	< 220	< 1000		< 9100	< 9400	< 15000	< 8800	< 2200	< 1800		
1,2-DIBROMOETHANE (ETHYLENE DIBROMIDE)	ug/kg	< 8630	< 8520		< 300	< 290	< 490	< 380	< 87	< 320	< 5100	< 570	< 89	< 420		< 3800	< 3900	< 6200	< 3600	< 900	< 740		
1,2-DICHLOROBENZENE	ug/kg	1,650,000	2,980,000		280,000	105,000	171,000	10,100	2,220	24,400	1,530,000	46,400	2,010	104,000		115,000	112,000	131,000	113,000	194,000	190,000		
1,2-DICHLOROETHANE	ug/kg	< 8300	< 8190		< 170	< 170	< 290	< 220	< 51	< 190	< 3000	< 330	< 52	< 250		< 2200	< 2300	< 3600	< 2100	< 530	< 430		
1,2-DICHLOROPROPANE	ug/kg	< 3190	< 3150		< 230	< 230	< 390	< 300	< 69	< 250	< 4100	< 450	< 71	< 340		< 3000	< 3100	< 4900	< 2900	< 720	< 590		
1,3-DICHLOROBENZENE	ug/kg	27400 J	46000 J		3,720	1390 J	2430 J	< 150	< 35	354 J	28200 J	521 J	< 36	1220 J		1880 J	1800 J	2500	1560 J	2740 J	2820 J		
1,4-DICHLOROBENZENE	ug/kg	139000 J	236,000		22,000	8,280	14,400	719 J	154 J	2100 J	153,000	3410 J	135 J	7,640		8750 J	8370 J	9990 J	< 1700	15,600	15,800		
1,4-DIOXANE (P-DIOXANE)	ug/kg	--	--		< 41000	< 40000	< 68000	< 53000	< 12000	< 44000	< 720000	< 79000	< 12000	< 59000		< 520000	< 540000	< 870000	< 510000	< 130000	< 100000		
2-HEXANONE	ug/kg	< 12400	< 12200		< 960	< 940	< 1600	< 1200	< 280	< 1000	< 17000	< 1900	< 290	< 1400		< 12000	< 13000	< 20000	< 12000	< 2900	< 2400		
ACETONE	ug/kg	< 12400	67700 J		3890 J	< 2400 J	12000 J	< 3100	1,680	3580 J	74400 J	< 4700 J	3,890	5890 J		< 31000	< 32000	< 52000	< 30000	9840 J	< 6100		
BENZENE	ug/kg	65,700,000	68,200,000		123,000	118,000	308,000	18,600	20,200	243,000	61,900,000	39,600	20,100	226,000		2,310,000	2,310,000	1,830,000	1,320,000	2,490,000	1,970,000		
BROMOCHLOROMETHANE	ug/kg	< 13900	< 13700		< 280	< 270	< 460	< 360	< 82	< 300	< 4900	< 540	< 85	< 400		< 3600	< 3700	< 5900	< 3500	< 860	< 700		
BROMODICHLOROMETHANE	ug/kg	< 4340	< 4290		< 150	< 150	< 250	< 190	< 45	< 160	< 2600	< 290	< 46	< 220		< 1900	< 2000	< 3200	< 1900	< 460	< 380		
BROMOFORM	ug/kg	< 18300	< 18100		< 140	< 140	< 230	< 180	< 42	< 150	< 2500	< 270	< 43	< 200		< 1800	< 1800	< 3000	< 1700	< 430	< 350		
BROMOMETHANE	ug/kg	< 20400	< 20100		< 260	< 250	< 430	< 330	< 76	< 280	< 4500	< 500	< 78	< 370		< 3300	< 3400	< 5500	< 3200	< 790	&lt		

Table 3 - Caisson #3  
 OU 8 Pilot Study ISS Memorandum  
 American Cyanamid Superfund Site  
 Bridgewater, NJ

Impoundment Xtab - Normal Results

Location		CAISSON #3		2/28/14-5/9/14	CAISSON #3										5/29/2014	5/29/2014	6/4/2014	ROLL OFF					
Sample Date		11/21/2013			5/28/2014												POST REMOVAL (Pre 2nd MIX)			6/4/2014			
Treatment Stage		PRE THERMAL (Raw Tar)			POST THERMAL (PRE ISS MIXING)											POST 1st MIX		POST 2nd MIX		6/4/2014			
Core/Depth		0-1.2'			0-1.2'											Sample A		Sample B		Sample C			
Parameter	Unit	112113-TAR-TC03-0012 (Encore)	112113-TAR-TC03-0012		A - 0.8-2.2'	A - 5-5.8'	A - 7-8.2'	B - 0.9-1.6'	B - 5-7.6'	B - 5-7.6' Dup	B - 7.6-8'	C - 4-5'	C - 5-7'	C - 7-8'	052814-PTM-TC03A-	052814-PTM-TC03B-	060414-TAR-TC03A	060414-TAR-TC03B	060414-TAR-TC03C	060414-TAR-TC03C-D	6/4/2014	6/4/2014	
2,4,5-TRICHLOROPHENOL	ug/kg	--	< 40900	THERMAL TREATMENT	< 310	< 300	< 270	< 250	< 43	< 220	< 270	< 280	< 53 J	< 240	PURITY	< 390	< 790	< 660	< 140	< 150	< 120	6/4/2014	6/4/2014
2,4,6-TRICHLOROPHENOL	ug/kg	--	< 45700		< 250	< 250	< 220	< 200	< 35	< 180	< 220	< 220	< 43 J	< 190		< 320	< 640	< 530	< 120	< 100	< 120	6/4/2014	6/4/2014
2,4-DICHLOROPHENOL	ug/kg	--	< 37300		< 430	< 420	< 380 J	< 340	< 59 J	< 310	< 380 J	< 380	< 73 J	< 330		< 540	< 1100	< 910	< 200	< 210	< 170	6/4/2014	6/4/2014
2,4-DIMETHYLPHENOL	ug/kg	--	< 25700		4,010	5,590	4,110	463 J	567	< 330	< 400	1,540	522	< 350		3,130	3,670	3,030	2,120	< 220	1,520	6/4/2014	6/4/2014
2,4-DINITROPHENOL	ug/kg	--	< 88600		< 330	< 320	< 290	< 260	< 45	< 240	< 290	< 290	< 55 J	< 250		< 410	< 830	< 690	< 150	< 160	< 130	6/4/2014	6/4/2014
2,4-DINITROTOLUENE	ug/kg	--	< 26400		< 120	< 110	< 100	< 94	< 16	< 85	< 100	< 100	< 20 J	< 90		< 150	< 300	< 250	< 55	< 57	< 47	6/4/2014	6/4/2014
2,6-DINITROTOLUENE	ug/kg	--	< 48400		< 100	< 100	< 89	< 82	< 14	< 74	< 90	< 90	< 17 J	< 79		< 130	< 260	< 220	< 48	< 50	< 41	6/4/2014	6/4/2014
2-CHLORONAPHTHALENE	ug/kg	--	< 41300		< 84	< 81	< 73	< 66	< 11	< 60	< 73	< 74	< 14 J	< 64		< 100	< 210	< 180	< 39	< 41	< 33	6/4/2014	6/4/2014
2-CHLOROPHENOL	ug/kg	--	< 28500		< 270	< 260	< 230	< 210	< 37	< 190	< 240	< 240	< 45 J	< 210		< 340	< 680	< 570	< 120	< 130	< 110	6/4/2014	6/4/2014
2-METHYLNAPHTHALENE	ug/kg	--	463000 J		92,300	156,000	118,000	20,300	14200	10,100	143,000	72,300	26,700	62,700		146,000	171,000	103,000	56,300	83,000	52,700	6/4/2014	6/4/2014
2-METHYLPHENOL (O-CRESOL)	ug/kg	--	< 40100		1,260	1,810	449 J	269 J	227	< 220	< 270	612	465	< 230		< 390	1300 J	< 650	< 140	< 150	< 120	6/4/2014	6/4/2014
2-NITROANILINE	ug/kg	--	< 16500		< 120	< 120	< 100	< 94	< 16	< 85	< 100	< 100	< 20 J	< 91		< 150	< 300	< 250	< 55	< 58	< 47	6/4/2014	6/4/2014
2-NITROPHENOL	ug/kg	--	< 46400		< 290	< 280	< 250 J	< 230	< 39 J	< 210	< 250 J	< 250	< 48 J	< 220		< 360	< 720	< 600	< 130	< 140	< 110	6/4/2014	6/4/2014
3- AND 4- METHYLPHENOL (TOTAL)	ug/kg	--	--		4,260	6,060	3,920	875	703	502	< 300	2,080	872	1,630		2,740	< 860	< 720	< 160	< 170	< 140	6/4/2014	6/4/2014
3,3'-DICHLOROBENZIDINE	ug/kg	--	< 124000		< 68	< 66	< 60	< 54	< 9.4	< 49	< 60	< 60	< 11 J	< 52		< 86	< 170	< 140	< 32	< 33	< 27 J	6/4/2014	6/4/2014
3-NITROANILINE	ug/kg	--	< 17700		< 110	< 100	< 94	< 86	< 15	< 78	< 95	< 95	< 18 J	< 82		< 140	< 270	< 230	< 50	< 53	< 43	6/4/2014	6/4/2014
4,6-DINITRO-2-METHYLPHENOL	ug/kg	--	< 70100		< 330	< 320	< 290	< 260	< 45	< 240	< 290	< 290	< 55 J	< 250		< 410	< 830	< 690	< 150	< 160	< 130	6/4/2014	6/4/2014
4-BROMOPHENYL PHENYL ETHER	ug/kg	--	< 41300		< 98	< 95	< 85	< 78	< 13	< 70	< 86	< 86	< 16 J	< 75		< 120	< 250	< 210	< 45	< 48	< 39	6/4/2014	6/4/2014
4-CHLORO-3-METHYLPHENOL	ug/kg	--	< 29200		< 270	< 260	< 230 J	< 210	< 37 J	< 190	< 240 J	< 240	< 45 J	< 210		< 340	< 680	< 570	< 120	< 130	< 110	6/4/2014	6/4/2014
4-CHLOROANILINE	ug/kg	--	< 25000		< 86	< 84	< 75 J	< 69	< 12 J	< 62	< 76 J	< 76	< 14 J	< 66		< 110	< 220	< 180	< 40	< 42	< 34	6/4/2014	6/4/2014
4-CHLOROPHENYL PHENYL ETHER	ug/kg	--	< 28900		< 81	< 79	< 71	< 64	< 11	< 58	< 71	< 71	< 14 J	< 62		< 100	< 200	< 170	< 38	< 40	< 32	6/4/2014	6/4/2014
4-NITROANILINE	ug/kg	--	< 16700		< 110	< 100	< 92	< 84	< 14	< 76	< 92	< 93	< 18 J	< 80		< 130	< 260	< 220	< 49	< 51	< 42	6/4/2014	6/4/2014
4-NITROPHENOL	ug/kg	--	< 82600		< 460	< 440	< 400	< 360	< 62	< 330	< 400	< 4											

Table 3 - Caisson #3  
U 8 Pilot Study ISS Memorandum  
American Cyanamid Superfund Site  
Bridgewater, NJ

**Impoundment Xtab - Normal Results**

Location		CAISSON #3		CAISSON #3														ROLL OFF			
Sample Date		11/21/2013		2/28/14-5/9/14	5/28/2014										5/29/2014		6/4/2014	6/4/2014		6/4/2014	
Treatment Stage		PRE THERMAL (Raw Tar)			POST THERMAL (PRE ISS MIXING)										POST 1st MIX		POST REMOVAL (Pre 2nd MIX)	Sample A	Sample B	6/4/2014	
Core/Depth		0-1.2'		0-1.2'		A - 0.8-2.2'	A - 5-5.8'	A - 7-8.2'	B - 0.9-1.6'	B - 5-7.6'	B - 5-7.6' Dup	B - 7-8.8'	C - 4-5'	C - 5-7'	C - 7-8'	5/29/2014		6/4/2014	Sample A	Sample B	6/4/2014
Parameter	Unit	112113-TAR-TC03-0012 (Encore)	112113-TAR-TC03-0012			052814-TAR-TC03A-	052814-SWSM-TC03A-050058	052814-HC-TC03A-	052814-HC-TC03B-	052814-TAR-TC03B-	052814-TAR-TC03B-050076	052814-TAR-TC03B-	052814-HC-TC03C-	052814-SW-TC03C-	052814-HC-TC03C-	POST 1st MIX		6/4/2014	053014-PTM-TC03A-	053014-PTM-TC03B-	6/4/2014
M,P-Cresol	ug/kg	--	<48800			--	--	--	--	--	--	--	--	--	--	--	--	2,290,000	2,680,000		
NAPHTHALENE	ug/kg	--	9,690,000			1,330,000	2,280,000	2,530,000	286,000	273000	203,000	3,690,000	833,000	386,000	884,000	--	--	1,710,000	1,070,000		
NITROBENZENE	ug/kg	--	< 67700			< 78	< 76	< 68 J	< 62	< 11 J	< 56	< 69 J	< 69	< 13 J	< 60	--	--	< 160	< 200	1,740,000	
N-NITROSODI-N-PROPYLAMINE	ug/kg	--	< 56700			< 66	< 64	< 57	< 52	< 9	< 47	< 58	< 58	< 11 J	< 50	--	--	< 38	< 31	1,120,000	
N-NITROSODIPHENYLAMINE	ug/kg	--	< 27500			< 160	< 160	< 140	< 130	< 22	< 120	< 140	< 140	< 27 J	< 120	--	--	< 140	< 30	< 32	
PENTACHLOROPHENOL	ug/kg	--	< 29100			< 460	< 450	< 400	< 370	< 63	< 330	< 410	< 410	< 77 J	< 350	--	--	< 200	< 400	< 340	
PHENANTHRENE	ug/kg	--	< 29800			18,800	38,500	9,980	5,220	3080	3,050	13,300	14,900	10,600	8,910	--	--	17,500	24,500	< 74	
PHENOL	ug/kg	--	< 35800			< 280	< 270	< 250	993	801	< 200	< 250	2,100	< 48 J	661	--	--	< 350	< 710	< 950	
PYRENE	ug/kg	--	< 18200			704	< 100	309	190 J	< 14	371	< 91	1,700	1730 J	547	--	--	< 130	< 260	1,560	
PCBs																				697	
PCB, TOTAL	ug/kg	--	--			--	--	--	--	--	--	--	--	--	--	--	--	--	--	< 14	
PCB-1016 (AROCLOR 1016)	ug/kg	--	--			--	--	--	--	--	--	--	--	--	--	--	--	--	--	< 23 J	
PCB-1221 (AROCLOR 1221)	ug/kg	--	--			--	--	--	--	--	--	--	--	--	--	--	--	--	--	< 30	
PCB-1232 (Aroclor 1232)	ug/kg	--	--			--	--	--	--	--	--	--	--	--	--	--	--	--	--	< 34 J	
PCB-1242 (Aroclor 1242)	ug/kg	--	--			--	--	--	--	--	--	--	--	--	--	--	--	--	--	< 24 J	
PCB-1248 (Aroclor 1248)	ug/kg	--	--			--	--	--	--	--	--	--	--	--	--	--	--	--	--	< 22	
PCB-1254 (Aroclor 1254)	ug/kg	--	--			--	--	--	--	--	--	--	--	--	--	--	--	--	--	< 22 J	
PCB-1260 (Aroclor 1260)	ug/kg	--	--			--	--	--	--	--	--	--	--	--	--	--	--	--	--	< 18 J	
PCB-1268 (Aroclor 1268)	ug/kg	--	--			--	--	--	--	--	--	--	--	--	--	--	--	--	--	< 14 J	
Metals																					
ALUMINUM	mg/kg	--	106			--	--	--	--	--	--	--	--	--	--	--	--	--	--	13,100	
ANTIMONY	mg/kg	--	< 0.78			--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.9 J	
ARSENIC	mg/kg	--	2			--	--	--	--	--	--	--	--	--	--	--	--	--	--	18	
BAIRUM	mg/kg	--	8			--	--	--	--	--	--	--	--	--	--	--	--	--	--	127	
BERYLLIUM	mg/kg	--	< 0.052			--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	
CADMUM	mg/kg	--	< 0.065			< 0.01	< 0.01	< 0.0089	0.086 J	< 0.0072	< 0.0073	< 0.0092	< 0.0095	< 0.0088	< 0.0082	--	< 0.063	< 0.067	< 0.11	< 0.12	
CALCIUM	mg/kg	--	150			--	--	--	--	--	--	--	--	--	--	--	--	--	--	121,000	
CHROMIUM, TOTAL	mg/kg	--	5			--	--	--	--	--	--	--	--	--	--	--	--	--	--	21	
COBALT	mg/kg	--	0.29 J			--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.1 J	
COPPER	mg/kg	--	25			0.23 J	0.47 J	0.67 J	0.41 J	0.21 J	0.14 J	3	0.1 J	0.56 J	0.17 J	--	3	3	2	0.14 J	
IRON	mg/kg	--	2,630			--	--	--	--	--	--	--	--	--	--	--	--	--	--	9,280	
LEAD	mg/kg	--	59			11	16	17	5	10.1	8	14	18	36	23	--	24	30	30	25	
MAGNESIUM	mg/kg	--	30			--	--	--	--	--	--	--	--	--	--	--	--	--	--	6,750	
MANGANESE	mg/kg	--	15			--	--	--	--	--	--	--	--	--	--	--	--	--	--	295	
MERCURY	mg/kg	--	2			< 0.0032	< 0.0032	< 0.0028	0	0.0025 J	0	0	0	0.0055 J	0	--	< 0.0041	< 0.0043	0	0.0052 J	
NICKEL	mg/kg	--	6			2	3	3	7	1.1 J	0.85 J	2	2	2	6	--	7	8	8	6	
POTASSIUM	mg/kg	--	22.1 J			--	--	--	--	--	--	--	--	--	--	--	--	--	--	2,240	
SELENIUM	mg/kg	--	4			--	--	--	--	--	--	--	--	--	--	--	--	--	--	9	
SILVER	mg/kg	--	< 0.13			--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	
SODIUM	mg/kg	--	1,510			--	--	--	--	--	--	--	--	--	--	--	--	--	--	5,620	
THALLIUM	mg/kg	--	< 0.26			--	--	--	--	--	--	--	--	--	--	--	--	--	--	< 0.42	
VANADIUM	mg/kg	--	0.87 J			--	--	--	--	--	--	--	--	--	--	--	--	--	--	17	
ZINC	mg/kg	--	24			3	5	9	2	1.6	2	4	3	3	7	--	13	14	13	15	
AVS/SEM																					
ACID VOLATILE SULFIDE	umol/g	--	--			< 0.08	< 0.08	< 0.07	< 0.06	< 0.06	< 0.06	< 0.07	< 0.08	< 0.07	< 0.07	--	1	18	0	15	
CADMUM	umol/g	--	--			< 0.0014	< 0.0014	< 0.0012	0.000765 J	< 0.0011	< 0.0011	< 0.0013	< 0.0013	< 0.0012	< 0.0012	--	< 0.0089	< 0.0098	< 0.016	< 0.017	
COPPER	umol/g	--	--			0.00362 J	0.0074 J	0.0105 J	0.00645 J	0.00331 J	0.0022 J	0	0.00157 J	0.00881 J	0.00268 J	--	0	0	0	0	
LEAD	umol/g	--	--			0	0	0	0	0.0487	0	0	0	0	0	--	0	0	0	0	
MERCURY	umol/g	--	--			< 0.00004	< 0.00004	< 0.000035	0	0.0000125 J	0	0	0	0.0000274 J	0	--	< 0.00005	< 0.000055	0	0.0000259 J	
NICKEL	umol/g	--	--			0	0	0	0	0.0187 J	0.0145 J	0	0	0	0	--</td					

Table 3 - Caisson #3  
 OU 8 Pilot Study ISS Memorandum  
 American Cyanamid Superfund Site  
 Bridgewater, NJ

Impoundment Xtab - Normal Results

Location		CAISSON #3		2/28/14-5/9/14	CAISSON #3										5/29/2014	5/29/2014	ROLL OFF						
Sample Date		11/21/2013			5/28/2014												6/4/2014		6/4/2014				
Treatment Stage		PRE THERMAL (Raw Tar)			POST THERMAL (PRE ISS MIXING)												POST REMOVAL (Pre 2nd MIX)		POST 2nd MIX				
Core/Depth	Parameter	Unit	0-1.2'	0-1.2'	A - 0.8-2.2'	A - 5-5.8'	A - 7-8.2'	B - 0.9-1.6'	B - 5-7.6'	B - 5-7.6' Dup	B - 7-6.8'	C - 4-5'	C - 5-7'	C - 7-8'	Sample A	Sample B	Sample A	Sample B	Sample C	Sample C DUP			
			112113-TAR-TC03-0012 (Encore)	112113-TAR-TC03-0012	052814-TAR-TC03A-	052814-SWSM-TC03A-050058	052814-HC-TC03A-	052814-HC-TC03B-	052814-TAR-TC03B-	052814-TAR-TC03B-050076-	052814-HC-TC03B-	052814-SW-TC03C-	052814-HC-TC03C-	053014-PTM-TC03A-	053014-PTM-TC03B-	060414-TAR-TC03A	060414-TAR-TC03B	060414-TAR-TC03C	060414-TAR-TC03C-D				
CYANIDE	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	< 0.21	--					
DENSITY	g/cm3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--					
FLUORINE	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	118 J	--					
GROSS CALORIFIC VALUE	BTU/lb	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3120 J	--					
IGNITABILITY	Degrees F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	200	--					
MOISTURE, PERCENT (D4017)	percent	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	34	--					
MOISTURE, PERCENT (D4643)	percent	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	41	--					
NITROGEN, AMMONIA (AS N)	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13	--					
OXIDATION-REDUCTION POTENTIAL	mV	--	--	--	577	--	584	581	605	--	--	563	593	--	(168)	414	--	67	--				
PH	ph units	--	--	--	2	--	1	2	1.48	--	--	2	2	--	12	13	--	12	--				
SOLIDS, PERCENT	percent	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	59	--					
SULFIDE	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	< 4.8 J	--					
SULFUR, PERCENT	percent	--	--	--	4	11	13	11	14.1	--	14	22	11	8	13	9	5	--	--				
SULFUR, MOL (S8)	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	34200 J	--					
TOTAL ORGANIC CARBON	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	170000 J	--					

Notes:

-- = no sample taken

BTU/lb = British Thermal Units per pound

g/cm3=grams per cubic centimeter

ug/kg = micrograms per kilogram

mg/Kg = miligrams per kilogram

umol/g = micromoles per gram

Degree F = Degrees Fahrenheit

mV = millivolt

SU = Standard Units

J = estimated detected result

NA = Not applicable

< = non-detected result

Detects are in **BOLD** font

Table 4 - Summary  
 OU 8 Pilot Study ISS Memorandum  
 American Cyanamid Superfund Site  
 Bridgewater, NJ

Summary

		Pre-Treatment (Raw Tar)						Post ISTT						Post 1st Mix						Post Removal						Post 2nd Mix					
		Range		Median	Average	Std. Dev.	Notes	Range		Median	Average	Std. Dev.	Notes	Range		Median	Average	Std. Dev.	Notes	Range		Median	Average	Std. Dev.	Notes	Range		Median	Average	Std. Dev.	Notes
Caisson #1	Units	Low	High					Low	High					Low	High		Low	High		Low	High		Low	High		Low	High		Low	High	
Benzene	mg/kg	36,000	140,000	55,800	<b>65,514</b>	34,740	Outlier Removed	--	--	--	--	--	No ISTT on Caisson 1	18,600	28,300	23,450	<b>23,450</b>	6,859		27,600	27,600	27,600	N/A	One Value	16,800	16,800	16,800	N/A	One Value		
Total VOCs	mg/kg	50,084	182,187	69,043	<b>84,689</b>	44,684	Outlier Removed	--	--	--	--	--		24,035	35,713	29,874	<b>29,874</b>	8,258		34,312	34,312	34,312	N/A	One Value	21,360	21,360	21,360	N/A	One Value		
Naphthalene	mg/kg	24,600	24,600	24,600	<b>24,600</b>	N/A	One Value	--	--	--	--	--		2,740	4,010	3,375	<b>3,375</b>	898		4,340	4,340	4,340	N/A	One Value	3,550	3,550	3,550	N/A	One Value		
TCLP Benzene	mg/L	326	326	326	<b>326</b>	N/A	One Value	--	--	--	--	--		345	533	439	<b>439</b>	133		--	--	--	No Data	313	313	313	N/A	One Value			
SPLP Benzene	mg/L	383	383	383	<b>383</b>	N/A	One Value	--	--	--	--	--		463	479	471	<b>471</b>	11		--	--	--	No Data	313	313	313	N/A	One Value			
Caisson #3	Units																														
Chemical Parameters																															
Benzene	mg/kg	<b>65,700</b>	68,200	66,950	<b>66,950</b>	1,768		19	61,900	118	<b>6,975</b>	20,597			2,310	2,310	2,310	<b>2,310</b>	-	2 identical values	1,320	1,830	1,575	<b>1,575</b>	361		2,490	2,490	2,490	N/A	One Value
Total VOCs	mg/kg	<b>84,034</b>	92,121	88,078	<b>88,078</b>	5,719		34	76,502	389	<b>8,833</b>	25,378			3,002	3,032	3,017	<b>3,017</b>	21		1,890	2,561	2,225	<b>2,225</b>	474		3,543	3,543	3,543	N/A	One Value
Naphthalene	mg/kg	<b>9,690</b>	9,690	9,690	<b>9,690</b>	N/A	One Value	273	3,690	884	<b>1,388</b>	1,195			2,290	2,680	2,485	<b>2,485</b>	276		1,070	1,710	1,390	<b>1,390</b>	453		1,740	1,740	1,740	N/A	One Value
TCLP Benzene	mg/L	<b>526</b>	526	526	<b>526</b>	N/A	One Value	0.281	12	0.45	<b>3</b>	5			85	85	85	<b>85</b>	18		--	--	--	No Data	59	59	59	N/A	One Value		
SPLP Benzene	mg/L	<b>531</b>	531	531	<b>531</b>	N/A	One Value	0.085	10	0.28	<b>2</b>	4			87	132	110	<b>110</b>	32		--	--	--	No Data	59	59	59	N/A	One Value		

(a) One of six samples omitted from average/standard deviation assessment due to an anomalously high value (outlier).

Table 5 - TCLP  
OU 8 Pilot Study ISS Memorandum  
American Cyanamid Superfund Site  
Bridgewater, NJ

**Impoundment Xtab - TCLP Results**

Location		CAISSON 1				CAISSON 3									
Sample Date		11/12/2013	5/30/2014		6/5/2014	5/28/2014				5/30/2014		6/4/2014			
Treatment Stage		PRE ISS (RAW TAR)	POST 1st MIX		POST 2nd MIX	POST THERMAL (PRE ISS MIXING)				POST 1st MIX		POST 2nd MIX			
Core/Depth		0-1.2'	A -6-8'	B - 6-8'	Sample B	0-1.2'	A - 0.8-2.2'	A - 7-8.2'	B - 0.9-1.6'	B - 5-7.6'	C - 4-5'	C - 5-7'	A - 6-8'		
Parameter	Unit	112113-TAR-TC01-0012	053014-PTM-TC01A-060080	053014-PTM-TC01B-060080	060514-TAR-TC01B	052814-TAR-TC03A-008022	052814-HC-TC03A-070082	052814-HC-TC03B-009016	052814-TAR-TC03B-050076	052814-HC-TC03C-040050	052814-SW-TC03C-050070	053014-PTM-TC03A-060080	053014-PTM-TC03B-060080	060414-TAR-TC03C	
<b>TCLP VOCs</b>															
1,1-DICHLOROETHENE	mg/L	< 1	< 0.17	< 0.034	< 0.17	< 1	< 0.0017	< 0.0017	< 0.0017	< 0.0017	< 0.0017	< 0.0017	< 0.0017	< 0.17	
1,2-DICHLOROETHANE	mg/L	< 0.581	< 0.11	< 0.022	< 0.11	< 0.581	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.11	
1,4-DICHLOROBENZENE	mg/L	--	< 0.15	<b>0.108</b>	< 0.15	--	<b>0.0723</b>	<b>0.0477</b>	<b>0.0053</b>	< 0.0015	<b>0.0043 J</b>	< 0.0015	<b>0.072</b>	<b>0.0707</b>	< 0.15
BENZENE	mg/L	<b>326</b>	<b>345</b>	<b>533</b>	<b>313</b>	<b>526</b>	<b>3</b>	<b>11.6</b>	<b>0.448</b>	<b>0.401</b>	<b>0.281</b>	< 0.0823	<b>84.7</b>	<b>84.9</b>	<b>59.2</b>
CARBON TETRACHLORIDE	mg/L	< 1.24	< 0.11	< 0.023	< 0.11	< 1.24	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.11	
CHLOROBENZENE	mg/L	< 0.414	< 0.17	< 0.035	< 0.17	< 0.414	<b>0.0066</b>	<b>0.0038 J</b>	< 0.0017	< 0.0017	< 0.0017	< 0.0017	<b>0.0133</b>	<b>0.0131</b>	< 0.17
CHLOROFORM	mg/L	< 0.775	< 0.12	<b>0.0275 J</b>	< 0.12	< 0.775	< 0.0012	< 0.0012	< 0.0012	< 0.0012	< 0.0012	< 0.0012	<b>0.0035 J</b>	<b>0.0035 J</b>	< 0.12
NAPHTHALENE	mg/L	<0.881	--	--	--	<0.881	--	--	--	--	--	--	--	--	
METHYL ETHYL KETONE (2-BUTANONE)	mg/L	< 0.711	< 1.6	< 0.32	< 1.6	< 0.711	< 0.016	<b>0.0633 J</b>	< 0.016	< 0.016	< 0.016	<b>0.0224 J</b>	<b>0.0284 J</b>	< 1.6	
TETRACHLOROETHYLENE (PCE)	mg/L	< 0.963	< 0.13	< 0.025	< 0.13	< 0.963	< 0.0013	< 0.0013	< 0.0013	< 0.0013	< 0.0013	< 0.0013	< 0.0013	< 0.13	
TRICHLOROETHYLENE (TCE)	mg/L	< 0.807	< 0.25	< 0.051	< 0.25	< 0.807	< 0.0025	< 0.0025	< 0.0025	< 0.0025	< 0.0025	< 0.0025	< 0.0025	< 0.25	
VINYL CHLORIDE	mg/L	< 0.636	< 0.26	< 0.051	< 0.26	< 0.636	< 0.0026	< 0.0026	< 0.0026	< 0.0026	< 0.0026	< 0.0026	< 0.0026	< 0.26	
<b>TCLP SVOCs</b>															
1,4-DICHLOROBENZENE	mg/L	< 0.0245	<b>0.059</b>	<b>0.0353</b>	<b>0.0568</b>	< 0.0245	<b>0.0246</b>	<b>0.0171 J</b>	< 0.0036	< 0.0036	< 0.0036	< 0.0036	<b>0.0246</b>	<b>0.0261</b>	<b>0.0202</b>
2,4,5-TRICHLOROPHENOL	mg/L	< 0.0134	< 0.016	< 0.016	< 0.016	< 0.0134	< 0.016	< 0.016	< 0.016	< 0.016	< 0.016	< 0.016	< 0.016	< 0.016	
2,4,6-TRICHLOROPHENOL	mg/L	< 0.0162	< 0.013	< 0.013	< 0.013	< 0.0162	< 0.013	< 0.013	< 0.013	< 0.013	< 0.013	< 0.013	< 0.013	< 0.013	
2,4-DINITROTOLUENE	mg/L	< 0.0141	< 0.0043	< 0.0043	< 0.0043	< 0.0141	< 0.0043	< 0.0043	< 0.0043	< 0.0043	< 0.0043	< 0.0043	< 0.0043	< 0.0043	
2-METHYLPHENOL (O-CRESOL)	mg/L	< 0.0126	<b>0.0193 J</b>	<b>0.027</b>	<b>0.0196 J</b>	< 0.0126	<b>0.0414</b>	<b>0.0123 J</b>	< 0.01	< 0.01	< 0.01	< 0.01	<b>0.0208</b>	<b>0.0222</b>	<b>0.0125 J</b>
3- AND 4- METHYLPHENOL (TOTAL)	mg/L	--	<b>0.12</b>	<b>0.115</b>	< 0.0093	--	<b>0.1</b>	<b>0.124</b>	<b>0.0176 J</b>	< 0.0093	<b>0.0261</b>	< 0.0093	<b>0.0453</b>	<b>0.046</b>	<b>0.0334</b>
CRESOL	mg/L	<0.0215	--	--	--	<0.0215	--	--	--	--	--	--	--	--	
HEXACHLOROBENZENE	mg/L	< 0.025	< 0.0034	< 0.0034	< 0.0034	< 0.025	< 0.0034	< 0.0034	< 0.0034	< 0.0034	< 0.0034	< 0.0034	< 0.0034	< 0.0034	
HEXACHLOROBUTADIENE	mg/L	< 0.0245	< 0.0051	< 0.0051	< 0.0051	< 0.0245	< 0.0051	< 0.0051	< 0.0051	< 0.0051	< 0.0051	< 0.0051	< 0.0051	< 0.0051	
HEXACHLOROETHANE	mg/L	< 0.0238	< 0.0055	< 0.0055	< 0.0055	< 0.0238	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.0055	
M,P-CRESOL		<0.0088	--	--	--	<0.0088	--	--	--	--	--	--	--	--	
NITROBENZENE	mg/L	<b>0.631</b>	< 0.0042	< 0.0042	< 0.0042	< 0.019	< 0.0042	< 0.0042	< 0.0042	< 0.0042	< 0.0042	< 0.0042	< 0.0042	< 0.0042	
PENTACHLOROPHENOL	mg/L	< 0.0144	< 0.014	< 0.014	< 0.014	< 0.0144	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014	
PYRIDINE	mg/L	<b>0.238 J</b>	<b>0.555</b>	<b>0.301</b>	<b>1.77</b>	<b>0.646</b>	<b>0.223</b>	<b>4.33</b>	<b>0.464</b>	<b>1.26</b>	<b>0.204</b>	< 0.0032	<b>0.329</b>	<b>0.0462</b>	<b>0.237</b>
<b>TCLP Metals</b>															
ARSENIC	mg/L	< 0.025	<b>0.0029 J</b>	<b>0.057 J</b>	<b>0.022 J</b>	< 0.025	< 0.0026	< 0.0026	< 0.0026	< 0.0026	< 0.0026	< 0.0026	< 0.0026	<b>0.014 J</b>	
BARIUM	mg/L	< 0.013	<b>0.69 J</b>	<b>0.48 J</b>	<b>0.33 J</b>	< 0.013	<b>0.054 J</b>	<b>0.023 J</b>	<b>0.04 J</b>	<b>0.026 J</b>	<b>0.051 J</b>	<b>0.037 J</b>	<b>0.27 J</b>	<b>0.28 J</b>	<b>0.75 J</b>
CADMIUM	mg/L	< 0.0063	<b>0.0011 J</b>	<b>0.0025 J</b>	< 0.0007	< 0.0063	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	<b>0.0009 J</b>	<b>0.0011 J</b>	< 0.0007	
CHROMIUM, TOTAL	mg/L	<b>0.067 J</b>	< 0.00089	<b>0.052</b>	<b>0.011</b>	<b>0.13 J</b>	<b>0.14</b>	<b>0.25</b>	<b>0.11</b>	<b>0.28</b>	<b>0.092</b>	<b>0.12</b>	< 0.00089	<b>0.0016 J</b>	< 0.00089
LEAD	mg/L	<b>0.26 J</b>	<b>0.013 J</b>	<b>0.035 J</b>	< 0.0065	<b>0.29 J</b>	<b>0.32 J</b>	<b>0.8</b>	<b>0.38 J&lt;/</b>						

Table 6 - SPLP  
 OU 8 Pilot Study ISS Memorandum  
 American Cyanamid Superfund Site  
 Bridgewater, NJ

Impoundment Xtab - SPLP Results

Location	CAISSON 1					CAISSON 3					
	11/12/2013	5/30/2014	6/5/2014			11/12/2013	5/28/2014				
Treatment Stage	PRE ISS (RAW TAR)	POST 1st MIX		POST 2nd MIX	PRE THERMAL (RAW TAR)	POST THERMAL (PRE ISS MIXING)				POST 1st MIX	
Core/Depth	0-1.2'	A - 6-8'	B - 6-8'	Sample B	0-0.1'	A - 0.8-2.2'	A - 7-8.2'	B - 0.9-1.6'	B - 5-7.6'	C - 4-5'	
Parameter	Unit	112113-TAR-TC01-0012	053014-PTM-TC01A-060080	053014-PTM-TC01B-060080	060514-TAR-TC01B	052814-TAR-TC03A-008022	052814-HC-TC03A-070082	052814-HC-TC03B-009016	052814-TAR-TC03B-050076	052814-HC-TC03C-040050	052814-SW-TC03C-050070
SPLP VOCs											
1,1,1-TRICHLOROETHANE	mg/L	ND	0.0068 J	0.0075 J	< 0.5	ND	< 0.0025	< 0.012	< 0.0005	< 0.0005	< 0.0005
1,1,1,2-TETRACHLOROETHANE	mg/L	ND	--	--	--	ND	--	--	--	--	--
1,1,2,2-TETRACHLOROETHANE	mg/L	ND	< 0.002	< 0.002	< 0.39	ND	< 0.002	< 0.0098	< 0.00039	< 0.00039	< 0.00039
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	mg/L	ND	< 0.0077	< 0.0077	< 1.5	ND	< 0.0077	< 0.038	< 0.0015	< 0.0015	< 0.00077
1,1,2-TRICHLOROETHANE	mg/L	ND	< 0.0021	< 0.0021	< 0.42	ND	< 0.0021	< 0.011	< 0.00042	< 0.00042	< 0.00021
1,1-DICHLOROETHANE	mg/L	ND	< 0.0026	< 0.0026	< 0.52	ND	< 0.0026	< 0.013	< 0.00052	< 0.00052	< 0.0026
1,1-DICHLOROETHENE	mg/L	ND	< 0.0034	< 0.0034	< 0.69	ND	< 0.0034	< 0.017	< 0.00069	< 0.00069	< 0.0034
1,1-DICHLOROPROPENE	mg/L	ND	--	--	--	ND	--	--	--	--	--
1,3-DICHLOROPROpane	mg/L	ND	--	--	--	ND	--	--	--	--	--
2,2-DICHLOROPROpane	mg/L	ND	--	--	--	ND	--	--	--	--	--
1,2,3-TRICHLOROBENZENE	mg/L	--	< 0.0024	< 0.0024	< 0.49	--	< 0.0024	< 0.012	< 0.00049	< 0.00049	< 0.00024
1,2,4-TRICHLOROBENZENE	mg/L	ND	< 0.0022	< 0.0022	< 0.43	ND	< 0.0022	< 0.011	< 0.00043	< 0.00043	< 0.00022
1,2,3-TRICHLOROPROPANE	mg/L	ND	--	--	--	ND	--	--	--	--	--
1,2,4-TRIMETHYLBENZENE	mg/L	ND	--	--	--	ND	--	--	--	--	--
1,3,5-TRIMETHYLBENZENE	mg/L	ND	--	--	--	ND	--	--	--	--	--
1,2-DIBROMO-3-CHLOROPROPANE	mg/L	ND	< 0.013	< 0.013	< 2.5	ND	< 0.013	< 0.063	< 0.0025	< 0.0025	< 0.0013
1,2-DIBROMOETHANE (ETHYLENE DIBROMIDE)	mg/L	ND	< 0.0016	< 0.0016	< 0.32	ND	< 0.0016	< 0.008	< 0.00032	< 0.00032	< 0.00016
1,2-DICHLOROBENZENE	mg/L	1.69 J	1.47	1.37	1.37 J	1.37 J	0.52	0.397	0.0978	0.0089	0.0971
1,2-DICHLOROETHANE	mg/L	ND	< 0.0022	< 0.0022	< 0.44	ND	< 0.0022	< 0.011	< 0.00044	< 0.00044	< 0.00022
1,2-DICHLOROETHENE (TOTAL)	mg/L	ND	--	--	--	ND	--	--	--	--	--
1,2-DICHLOROPROPANE	mg/L	ND	< 0.0028	< 0.0028	< 0.56	ND	< 0.0028	< 0.014	< 0.00056	< 0.00056	< 0.00028
1,3-DICHLOROBENZENE	mg/L	ND	0.0219	0.02	< 0.63	ND	0.0068 J	< 0.016	0.00088 J	< 0.00063	0.00073 J
1,4-DICHLOROBENZENE	mg/L	ND	0.122	0.112	< 0.6	ND	0.0401	0.0317 J	0.0051	< 0.0006	0.0045
1,4-DIOXANE (P-DIOXANE)	mg/L	--	< 0.73	< 0.73	< 150	--	< 0.73	< 3.6	< 0.15	< 0.15	< 0.073
2-CHLOROTOLUENE	mg/L	ND	--	--	--	ND	--	--	--	--	--
4-CHLOROTOLUENE	mg/L	ND	--	--	--	ND	--	--	--	--	--
2-HEXANONE	mg/L	ND	0.0388 J	0.0825	< 3.4	ND	< 0.017	< 0.085	< 0.0034	< 0.0034	< 0.0017
4-ISOPROPYLTOLUENE	mg/L	ND	--	--	--	ND	--	--	--	--	--
4-METHYL-2-PENTANONE	mg/L	ND	--	--	--	ND	--	--	--	--	--
ACETONE	mg/L	ND	1.4	2.99	< 6.7	ND	0.127	< 0.17	0.0454	0.0341	0.0448
BENZENE	mg/L	383	463	479	313	531	1.82	9.65	0.473	0.227	0.28
BROMOBENZENE	mg/L	ND	--	--	--	ND	--	--	--	--	--
BROMOCHLOROMETHANE	mg/L	ND	< 0.0042	< 0.0042	< 0.83	ND	< 0.0042	< 0.021	< 0.00083	< 0.00083	< 0.00042
BROMODICHLOROMETHANE	mg/L	ND	< 0.0021	< 0.0021	< 0.42	ND	< 0.0021	< 0.011	< 0.00042	< 0.00042	< 0.0021
BROMOFORM	mg/L	ND	< 0.003	< 0.003	< 0.6	ND	< 0.003	< 0.015	< 0.0006	< 0.0006	< 0.003
BROMOMETHANE	mg/L	ND	< 0.0056	< 0.0056	< 1.1	ND	< 0.0056	< 0.028	< 0.0011	< 0.0011	< 0.0056
CARBON DISULFIDE	mg/L	ND	0.0479	0.369	< 0.36	1.04 J	0.004 J	0.0316 J	0.0038 J	0.0019 J	0.0019 J
CARBON TETRACHLORIDE	mg/L	ND	< 0.0023	< 0.0023	< 0.45	ND	< 0.0023	< 0.011	< 0.00045	< 0.00045	< 0.00023
CHLOROBENZENE	mg/L	ND	0.0261	0.0273	< 0.69	ND	< 0.0035	< 0.017	< 0.00069	< 0.00069	< 0.00035
CHLOROETHANE	mg/L	ND	< 0.0039	0.0663	< 0.78	ND	< 0.0039	0.027 J	< 0.0019	< 0.00078	< 0.00039
CHLOROFORM	mg/L	ND	0.0038 J	0.007 J	< 0.49	ND	< 0.0025	< 0.012	< 0.00049	< 0.00049	< 0.00025
CHLOROMETHANE	mg/L	ND	< 0.0036	0.0104	< 0.73	ND	< 0.0036	< 0.018	0.0017 J	< 0.00073	< 0.00036
CIS-1,2-DICHLOROETHYLENE	mg/L	ND	< 0.0024	< 0.0024	< 0.48	ND	< 0.0024	< 0.012	< 0.00048	< 0.00048	< 0.00024
CIS-1,3-DICHLOROPROPENE	mg/L	ND	< 0.0015	< 0.0015	< 0.3	ND	< 0.0015	< 0.0076	< 0.0003	< 0.0003	< 0.00015
CYCLOHEXANE	mg/L	--	0.0135 J	0.0183 J	< 0.36	--	< 0.0018	< 0.009	< 0.00036	< 0.00036	< 0.00018
DIBROMOCHLOROMETHANE	mg/L	ND	< 0.0019	< 0.0019	< 0.38	ND	< 0.0019	< 0.0096	< 0.00038	< 0.00038	< 0.00019
DIBROMOMETHANE	mg/L	ND	--	--	--	ND	--	--	--	--	--
DICHLORODIFLUOROMETHANE	mg/L	ND	< 0.0063	< 0.0063	< 1.3	ND	< 0.0063	< 0.032	< 0.0013	< 0.0013	< 0.0063
ETHYLBENZENE	mg/L	ND	0.28	0.295	< 0.42	ND	0.0391	0.0316 J	0.0061	0.0013 J	0.0047
ISOPROPYLBENZENE (CUMENE)	mg/L	ND	0.358	0.354	< 0.45	ND	0.0458	0.0242 J	0.0054	0.00083 J	0.005
M,P-XYLENE (SUM OF ISOMERS)	mg/L	ND	2.81	2.92	2.83	ND	0.395	0.981	0.0827	0.0142	0.0409
METHYL ACETATE	mg/L	--	< 0.015	< 0							

Table 6 - SPLP  
 OU 8 Pilot Study ISS Memorandum  
 American Cyanamid Superfund Site  
 Bridgewater, NJ

Impoundment Xtab - SPLP Results

Location	CAISSON 1								CAISSON 3											
	Sample Date		11/12/2013		5/30/2014		6/5/2014		5/28/2014				5/30/2014		6/4/2014					
Treatment Stage	Parameter	Unit	PRE ISS (RAW TAR)		POST 1st MIX		POST 2nd MIX		POST THERMAL (PRE ISS MIXING)				POST 1st MIX		POST 2nd MIX					
			Core/Depth	0-1.2'	A - 6-8'	B - 6-8'	Sample B	0-0.1'	A - 0.8-2.2'	A - 7-8.2'	B - 0.9-1.6'	B - 5-7.6'	C - 4-5'	C - 5-7'	A - 6-8'	B - 6-8'	Sample C			
STYRENE	mg/L	ND		< 0.003	< 0.003	< 0.003	< 0.6	112113-TAR-TC01-0012	053014-PTM-TC01A-060080	053014-PTM-TC01B-060080	060514-TAR-TC01B	ND	< 0.003	< 0.006	< 0.0006	< 0.0006	< 0.0003	< 0.03	< 0.003	< 0.076
TERT-BUTYLBENZENE	mg/L	ND		--	--	--	--	ND	--	--	--	ND	--	--	--	--	--	--	--	
TERT-BUTYL METHYL ETHER	mg/L	ND		< 0.0029	< 0.0029	< 0.0029	< 0.57	ND	< 0.0029	< 0.014	< 0.00057	< 0.00057	< 0.00057	< 0.00029	< 0.029	< 0.0029	< 0.071			
TETRACHLOROETHYLENE (PCE)	mg/L	ND		< 0.0025	< 0.0025	< 0.0025	< 0.5	ND	< 0.0025	< 0.013	< 0.0005	< 0.0005	< 0.0005	< 0.00025	< 0.025	< 0.0025	< 0.063			
TOLUENE	mg/L	39		55.8	45	37		47.9	1.09	1.66	0.14	0.0323	0.0755	0.0075	16.7	12.8	8.95			
TRANS-1,2-DICHLOROETHENE	mg/L	ND		< 0.0038	< 0.0038	< 0.0038	< 0.76	ND	< 0.0038	< 0.019	< 0.00076	< 0.00076	< 0.00076	< 0.00038	< 0.038	< 0.0038	< 0.095			
TRANS-1,3-DICHLOROPROPENE	mg/L	ND		< 0.0021	< 0.0021	< 0.0021	< 0.41	ND	< 0.0021	< 0.01	< 0.00041	< 0.00041	< 0.00041	< 0.00021	< 0.021	< 0.0021	< 0.052			
TRANS-1,4-DICHLORO-2-BUTENE	mg/L	ND		--	--	--	--	ND	--	--	--	--	--	--	--	--	--			
TRICHLOROETHYLENE (TCE)	mg/L	ND		< 0.0051	< 0.0051	< 0.0051	< 1	ND	< 0.0051	< 0.025	< 0.001	< 0.001	< 0.001	< 0.00051	< 0.051	< 0.0051	< 0.13			
TRICHLOROFUROMETHANE	mg/L	ND		< 0.0033	< 0.0033	< 0.0033	< 0.67	ND	< 0.0033	< 0.017	< 0.00067	< 0.00067	< 0.00067	< 0.00033	< 0.033	< 0.0033	< 0.084			
VINYL ACETATE	mg/L	ND		--	--	--	--	ND	--	--	--	--	--	--	--	--				
VINYL CHLORIDE	mg/L	ND		< 0.0051	< 0.0051	< 0.0051	< 1	ND	< 0.0051	< 0.026	< 0.001	< 0.001	< 0.001	< 0.00051	< 0.051	< 0.0051	< 0.13			
Xylenes	mg/L	ND		3.7	3.81	3.58		ND	0.525	1.09	0.0977	0.0165	0.052	0.0018	2.47	2.07	1.6			
<b>SPLP SVOCs</b>																				
1,2,4,5-TETRACHLOROBENZENE	mg/L	ND		< 0.00031	< 0.00033	< 0.00031		ND	< 0.00051	< 0.00036	< 0.00035	< 0.00036	< 0.00035	< 0.00034	< 0.00031	< 0.00032	< 0.00031			
1,2-DIPHENYLHYDRAZINE/AZOBENZEN	mg/L	ND		--	--	--		ND	--	--	--	--	--	--	--	--				
2,2-OXYBIS(2-CHLOROPROPANE)	mg/L	--		< 0.00047 J	< 0.00049	< 0.00045		--	< 0.00076	< 0.00054	< 0.00053	< 0.00053	< 0.00052	< 0.00051	< 0.00045	< 0.00048	< 0.00045			
2,3,4,6-TETRACHLOROPHENOL	mg/L	--		< 0.00097	< 0.001	< 0.00094		--	< 0.0016	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.00094	< 0.00094				
2,4,5-TRICHLOROPHENOL	mg/L	ND		< 0.0016	< 0.0017	< 0.0016		ND	< 0.0026	< 0.0019	< 0.0018	< 0.0018	< 0.0018	< 0.0018	< 0.0016	< 0.0016				
2,4,6-TRICHLOROPHENOL	mg/L	ND		< 0.0013	< 0.0014	< 0.0013		ND	< 0.0022	< 0.0015	< 0.0015	< 0.0015	< 0.0014	< 0.0014	< 0.0014	< 0.0013				
2,4-DICHLOROPHENOL	mg/L	ND		< 0.0012	< 0.0012	< 0.0012		ND	< 0.0019	< 0.0014	< 0.0013	< 0.0014	< 0.0013	< 0.0013	< 0.0012	< 0.0012				
2,4-DIMETHYLPHENOL	mg/L	ND		0.0371	0.0598	< 0.0015		ND	0.0939	0.063	0.0159	0.0031 J	0.0118	< 0.0017	0.15	0.0856	0.0297			
2,4-DINITROPHENOL	mg/L	ND		< 0.017	< 0.018	< 0.017		ND	< 0.028	< 0.02	< 0.019	< 0.019	< 0.019	< 0.019	< 0.017	< 0.017	< 0.017			
2,4-DINITROTOLUENE	mg/L	ND		< 0.00044	< 0.00046	< 0.00043		ND	< 0.00071	< 0.00051	< 0.0005	< 0.00048	< 0.00048	< 0.00043	< 0.00045	< 0.00043				
2,6-DINITROTOLUENE	mg/L	ND		< 0.00048	< 0.0005	< 0.00046		ND	< 0.00077	< 0.00055	< 0.00054	< 0.00054	< 0.00052	< 0.00052	< 0.00046	< 0.00046				
2-CHLORONAPHTHALENE	mg/L	ND		< 0.00031	< 0.00032	< 0.0003		ND	< 0.0005	< 0.00035	< 0.00035	< 0.00035	< 0.00034	< 0.00033	< 0.0003	< 0.0003				
2-CHLOROPHENOL	mg/L	ND		< 0.001 J	< 0.001	< 0.00097		ND	< 0.0016	< 0.0012	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.00097	< 0.001	< 0.00097			
2-METHYLNAPHTHALENE	mg/L	0.0656 J		0.0385	0.0406	0.0245		0.124 J	0.0446	0.0393	0.0239	0.0018 J	0.0163	< 0.00043	0.0271	0.0434	0.0324			
2-METHYLPHENOL (O-CRESOL)	mg/L	ND		0.0293	0.0303	0.0013 J		ND	0.064	0.0185	0.0088	< 0.0012	0.0061	< 0.0012	0.0044	0.0052	0.0122			
2-NITROANILINE	mg/L	ND		< 0.0011	< 0.0012	< 0.0011		ND	< 0.0019	< 0.0013	< 0.0013	< 0.0013	< 0.0013	< 0.0012	< 0.0011	< 0.0011				
2-NITROPHENOL	mg/L	ND		< 0.0015	< 0.0016	< 0.0015		ND	< 0.0025	< 0.0018	< 0.0017	< 0.0018	< 0.0017	< 0.0017	< 0.0015	< 0.0016				
3- AND 4- METHYLPHENOL (TOTAL)	mg/L	--		< 0.00095 J	< 0.00099	< 0.00093		--	0.116	0.107	0.0277	< 0.0011	0.02	0.0021 J	< 0.00093	< 0.00097	0.0278			
3,3'-DICHLOROBENZIDINE	mg/L	ND		< 0.00037	< 0.00039	< 0.00036		ND	< 0.0006	< 0.000										

Table 6 - SPLP  
OU 8 Pilot Study ISS Memorandum  
American Cyanamid Superfund Site  
Bridgewater, NJ

Impoundment Xtab - SPLP Results

Location		CAISSON 1				CAISSON 3										
Sample Date		11/12/2013	5/30/2014	6/5/2014		5/28/2014							5/30/2014	6/4/2014		
Treatment Stage		PRE ISS (RAW TAR)	POST 1st MIX		POST 2nd MIX		POST THERMAL (PRE ISS MIXING)						POST 1st MIX		POST 2nd MIX	
Core/Depth		0-1.2'	A - 6-8'	B - 6-8'	Sample B		O-0.1'	A - 0.8-2.2'	A - 7-8.2'	B - 0.9-1.6'	B - 5-7.6'	C - 4-5'	C - 5-7'	A - 6-8'	B - 6-8'	Sample C
Parameter	Unit	112113-TAR-TC01-0012	053014-PTM-TC01A-060080	053014-PTM-TC01B-060080	060514-TAR-TC01B		112113-TAR-TC03-0012	052814-TAR-TC03A-008022	052814-HC-TC03A-070082	052814-HC-TC03B-009016	052814-TAR-TC03B-050076	052814-HC-TC03C-040050	052814-SW-TC03C-050070	053014-PTM-TC03A-060080	053014-PTM-TC03B-060080	060414-TAR-TC03
HEXACHLOROETHANE	mg/L	ND	< 0.00057 J	< 0.00059	< 0.00055		ND	< 0.00092	< 0.00065	< 0.00064	< 0.00065	< 0.00062	< 0.00062	< 0.00055	< 0.00058	< 0.00055
ISOPHORONE	mg/L	ND	0.0085	0.012	0.0273		0.0662	0.0243	0.0114	< 0.00032	< 0.00032	< 0.00031	< 0.00031	0.0519 J	0.0451	0.0045
M,P-CRESOL	mg/L	ND	--	--	--		ND	--	--	--	--	--	--	--	--	--
NAPHTHALENE	mg/L	ND	2.17	2.68	1.81		ND	2.72	2.77	1.01	0.107	0.757	--	1.96	2.84	1.82
NITROBENZENE	mg/L	0.682	< 0.00043	< 0.00045	< 0.00042		ND	< 0.0007	< 0.0005	< 0.00049	< 0.00049	< 0.00048	< 0.00047	< 0.00042	< 0.00044	< 0.00042
N-NITROSODI-N-PROPYLAMINE	mg/L	ND	< 0.00031	< 0.00032	< 0.0003		ND	< 0.0005	< 0.00036	< 0.00035	< 0.00036	< 0.00034	< 0.00034	< 0.0003	< 0.00032	< 0.0003
N-NITROSODIPHENYLAMINE	mg/L	ND	< 0.00031	< 0.00033	< 0.00031		ND	< 0.00051	< 0.00036	< 0.00035	< 0.00036	< 0.00035	< 0.00034	< 0.00031	< 0.00032	< 0.00031
N-NITROSODIMETHYLAMINE	mg/L	ND	--	--	--		ND	--	--	--	--	--	--	--	--	--
PYRIDINE	mg/L	0.586	--	--	--		1.04	--	--	--	--	--	--	--	--	--
PHENOL	mg/L	0.147 J	< 0.0013 J	< 0.0014	0.0327		0.213 J	0.147	0.084	0.0284	< 0.0015	0.0199	0.0037	0.0529 J	0.111	< 0.0013
<b>SPLP PAHs</b>																
ACENAPHTHENE	mg/L	--	0.00327	0.00358	0.00223 J		--	0.00484	0.00149	0.00249	< 0.00024	0.00192	< 0.00023	0.00257	0.00578	0.0019
ACENAPHTHYLENE	mg/L	ND	0.000348	< 0.00013	< 0.000024		ND	< 0.00039	< 0.00028	< 0.00027	< 0.00028	< 0.00027	< 0.00027	< 0.00024	< 0.00012	< 0.00024
ANTHRACENE	mg/L	ND	0.000424	< 0.00011	< 0.00002		ND	0.000263	0.000218	0.000222	< 0.000024	0.000143	< 0.000023	< 0.00002	< 0.00011	< 0.00002
BENZO(A)ANTHRACENE	mg/L	ND	< 0.000012	< 0.000062	0.000179		ND	< 0.000019	< 0.000014	< 0.000013	< 0.000014	< 0.000013	< 0.000013	< 0.000012	< 0.000061	< 0.000012
BENZO(A)PYRENE	mg/L	ND	< 0.000013	< 0.000066	< 0.000012		ND	< 0.000021	< 0.000015	< 0.000014	< 0.000014	< 0.000014	< 0.000014	< 0.000012	< 0.000065	< 0.000012
BENZO(B)FLUORANTHENE	mg/L	ND	< 0.00001	< 0.000054	< 0.00001		ND	< 0.000017	< 0.000012	< 0.000012	< 0.000011	< 0.000011	< 0.000011	< 0.00001	< 0.000053	< 0.00001
BENZO(G,H,I)PERYLENE	mg/L	ND	< 0.000016	< 0.000084	< 0.000016		ND	< 0.000026	< 0.000019	< 0.000018	< 0.000018	< 0.000018	< 0.000018	< 0.000016	< 0.000082	< 0.000016
BENZO(K)FLUORANTHENE	mg/L	ND	< 0.000015	< 0.00008	< 0.000015		ND	< 0.000025	< 0.000018	< 0.000017	< 0.000017	< 0.000017	< 0.000017	< 0.000015	< 0.000078	< 0.000015
CHRYSENE	mg/L	ND	< 0.000012	< 0.000063	0.000109		ND	< 0.00002	< 0.000014	< 0.000014	< 0.000014	< 0.000013	< 0.000013	< 0.000012	< 0.000062	< 0.000012
DIBENZ(A,H)ANTHRACENE	mg/L	ND	< 0.000017	< 0.000089	< 0.000017		ND	< 0.000028	< 0.00002	< 0.000019	< 0.00002	< 0.000019	< 0.000019	< 0.000017	< 0.000087	< 0.000017
FLUORANTHENE	mg/L	ND	< 0.000014	< 0.000072	0.000321		ND	< 0.000022	< 0.000016	< 0.000015	< 0.000016	< 0.000015	< 0.000015	< 0.000013	< 0.00007	< 0.000013
FLUORENE	mg/L	0.02 J	< 0.000018	< 0.000091	< 0.000017		0.308	< 0.000028	< 0.00002	< 0.00002	< 0.00002	< 0.000019	< 0.000019	< 0.000017	< 0.000089	< 0.000017
HEXAChLOROBENZENE	mg/L	ND	< 0.000017	< 0.000089	< 0.000017		ND	< 0.000028	< 0.00002	< 0.000019	< 0.00002	< 0.000019	< 0.000019	< 0.000017	< 0.000087	< 0.000017
INDENO(1,2,3-C,D)PYRENE	mg/L	ND	< 0.000015	< 0.000077	< 0.000014		ND	< 0.000024	< 0.000017	< 0.000017	< 0.000017	< 0.000016	< 0.000016	< 0.000014	< 0.000076	< 0.000014
NAPHTHALENE	mg/L	ND	--	--	--		ND	--	--	--	--	--	--	0.00302	--	--
PENTACHLOROPHENOL	mg/L	ND	< 0.0001	< 0.00054	< 0.0001		ND	< 0.00017	< 0.00012	< 0.00012	< 0.00012	< 0.00011	< 0.00011	< 0.0001	< 0.00053	< 0.0001
PHENANTHRENE	mg/L	ND	0.00076	0.00065	0.000646		ND	0.000822	0.000417	0.000521	0.000124	0.000444	< 0.000023	0.000511	0.000877	0.000509
PYRENE	mg/L	ND	< 0.000015	< 0.000081	0.000204		ND	< 0.000025	< 0.000018	< 0.000017	< 0.000018	< 0.000017	< 0.000017	< 0.000015	< 0.000079	< 0.000015
<b>SPLP Metals</b>																
ALUMINUM	mg/L	--	--	--	0.24		--	5.86	13.8	4.48	9.97	5.73	9.41	--	--	0.397
ANTIMONY	mg/L	--	--	--	< 0.0026		--	< 0.0026	< 0.0026	< 0.0026	< 0.0026	< 0.0026	--	--	< 0.0026	
ARSENIC	mg/L	ND	< 0.026	< 0.026	< 0.026		ND	< 0.0051	< 0.064	< 0.0051	< 0.013	< 0.0051	< 0.013	< 0.013	< 0.013	0.0082 J
BARIUM	mg/L	0.0089 J	0.19 J	0.079 J	0.273 J		0.012	0.034 J	0.0234 J	0.0293 J	0.0265 J	0.0369 J	0.0335 J	0.42 J	0.44 J	0.891 J
BERYLLIUM	mg/L	--	--	--	< 0.0004		--	0.0007 J	0.001 J	0.0004 J	0.0006 J	< 0.0004	0.0005 J	--	--	< 0.0004
CADMIUM	mg/L	ND	< 0.0007	< 0.0007	< 0.0007		ND	0.0007 J	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007
CALCIUM	mg/L	--	--	--	1050		--	2.16 J	4.45 J	1.93 J	6.07 J	3.85 J	4.21 J	--	--	449
CHROMIUM, TOTAL	mg/L	0.055	0.0069 J	0.0039 J	< 0.00089		0.14	0.113	0.241	0.0814	0.194	0.103	0.213	< 0.00089	< 0.00089	< 0.00089
COBALT	mg/L	--	--	--	0.0019 J		--	0.0059 J	0.0107 J	0.0017 J	0.0074 J	0.003 J	0.0054 J	--	--	0.0009 J
COPPER	mg/L	--	--	--	0.005 J		--	0.0087 J	0.0137	0.0237	0.0066 J	0.0051 J	0.0169	--	--	0.0037 J
IRON	mg/L	--	--	--	0.0435 J		--	108	149	71	151	90.5	146	--	--	0.0361 J
LEAD	mg/L	0.065	< 0.0013	< 0.0013	0.0081 J		0.36	0.257	0.739	0.32	0.671	0.353	0.685	< 0.0013	< 0.0013	0.0042 J
MAGNESIUM	mg/L	--	--	--	0.0467 J		--	1.56 J	1.87 J	0.895 J	1.22 J	1.35 J	1.52 J	--	--	< 0.041
MANGANESE	mg/L	--	--	--	0.0008 J		--	1.32	1.42	1.05	1.94	1.09	1.51	--	--	0.0005 J
MERCURY	mg/L	0.00014 J	0.0017	0.00024	0.00045		0.00063	< 0.000064	< 0.000064	< 0.000064	< 0.000064	< 0.000064	0.000079 J	0.00032	0.00033	0.00011 J
NICKEL	mg/L	--	--	--	0.0017 J		--	0.24	0.173	0.0476	0.0971	0.0784	0.12	--	--	< 0.0075
POTASSIUM	mg/L	--	--	--	47.5		--	8.6 J	12.9	6.03 J	7.06 J	8.58 J	10.2	--	--	64.7
SELENIUM	mg/L	< 0.013	0.0061 J	0.0046 J	< 0.0036		0.02 J	< 0.0036	< 0.0036	< 0.0036	< 0.0036	< 0.0036	< 0.0036	0.009 J	0.0081 J	< 0.0036
SILVER	mg/L	< 0.0025	0.0017 J	0.0027 J	0.0142		< 0.0025	0.0072 J	0.008 J	0.0055 J	0.0069 J	0.0059 J	0.0081 J	0.0021 J	0.002 J	0.0078 J
SODIUM	mg/L	--	--	--												

## **Notes:**

-- = no sample taken

mg/L = milligram per liter

J = estimated detected result

ND or < = non-detected result

Detects are in **BOLD** font

Table 7 - Physical Properties Testing  
 OU 8 Pilot Study ISS Memorandum  
 American Cyanamid Superfund Site  
 Bridgewater, NJ

Sample Number	Stage	Cure Interval	Unconfined Compressive Strength ASTM D2166					Hydraulic Conductivity (k) (cm/sec) ASTM D5084					Loss on Ignition (Organic Content) ASTM D2974						Average
			ASTM Moisture Content (%)	EPA Moisture Content (%)	Bulk Density (lb/ft <sup>3</sup> )	Dry Density (lb/ft <sup>3</sup> )	UCS (lb/in <sup>2</sup> )	ASTM Moisture Content (%)	EPA Moisture Content (%)	Bulk Density (lb/ft <sup>3</sup> )	Dry Density (lb/ft <sup>3</sup> )	Hydraulic Conductivity (cm/sec)	Average ASTM Moisture Content (%)	Average EPA Moisture Content (%)	Average ASTM Moisture Content (DUP) (%)	Average EPA Moisture Content (DUP) (%)	Average Loss on Ignition (Mass %)	Average Loss on Ignition (DUP)	
Raw Tar Sample																			
IMP2 - HC - Homogenized	Bench-Scale Test	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	VE	N/A	N/A	N/A	N/A	N/A	N/A	
Caisson #1 (ISS Only)																			
053014-TAR-TC01A-060080	Post ISS	28 Day	43.3	30.2	90.0	62.8	120.9	39.8	28.5	91.7	65.5	1.40E-08	51.9	34.1	48.4	32.6	29.1	28.1	31.4
		56 Day	44.3	30.7	93.3	64.7	249.0	43.4	30.3	91.4	63.8	1.50E-07							31.9
060514-TAR-TC01B	Post S/S	28 Day	67.57	40.3	86.2	51.5	16.0	67.0	40.1	84.2	50.4	1.10E-05	64.36	39.2	65.91	39.7	20.09	20.28	39.8
		56 Day	62.72	38.6	81.1	49.9	33.9	69.2	40.9	84.3	49.8	8.50E-06							39.6
Caisson #2 (ISTT Only)																			
052714-TAR-TC02B-0080090	Post ISTT	N/A	37.2	27.1	83.3	60.7	148.1	16.0	13.8	83.7	72.7	7.40E-06	26.5	21.0			59.0		20.6
052714-TAR-TC02C-090100	Post ISTT	N/A	28.9	22.4	72.8	56.5	23.1	27.5	21.6	76.4	59.9	3.20E-05	24.5	19.7	27.9	21.8	80.5	80.1	21.4
Caisson #3 (ISTT/ISS)																			
05281-TAR-TC03C-030040	Post ISTT	N/A	50.4	33.5	82.2	54.7	9.1	50.2	33.4	80.4	53.5	3.40E-04	50.3	33.5			29.3		33.5
052814-TAR-TC03C-040050	Post ISTT	N/A	46.6	31.8	85.7	58.5	56.2	45.7	31.4	84.6	58.1	3.20E-05	51.6	34.0	50.2	33.4	31.9	31.5	32.7
052914-TAR-TC03-000080	Post ISS	28 Day	81.7	45.0	80.7	44.4	62.8	73.0	42.2	85.1	49.2	1.60E-06	97.9	49.4	93.3	48.2	31.5	32.8	46.2
		56 Day	90.0	47.4	83.2	43.8	167.7	93.2	48.2	78.7	40.7	3.50E-07							48.3
060414-TAR-TC03C	Post S/S	28 Day	60.8	37.8	85.7	53.3	224.5	54.6	35.3	83.7	54.1	2.90E-07	62.66	38.6	59.44	37.3	18.54	19.66	37.3
		56 Day	62.3	38.4	86.2	53.1	197.5	60.4	37.6	86.0	53.6	8.70E-08							38.0

Notes:

% = percent

lb/ft<sup>3</sup> = pounds per square feet

lb/in<sup>2</sup> = pounds per square inch

cm/sec = centimeter per seconds

ASTM Moisture Content=Weight of Water/Dry Weight of Sample

EPA Moisture Content=Weight of Water/Wet Weight of Sample

N/A= Not applicable, Sample would not compact for UCS Testing

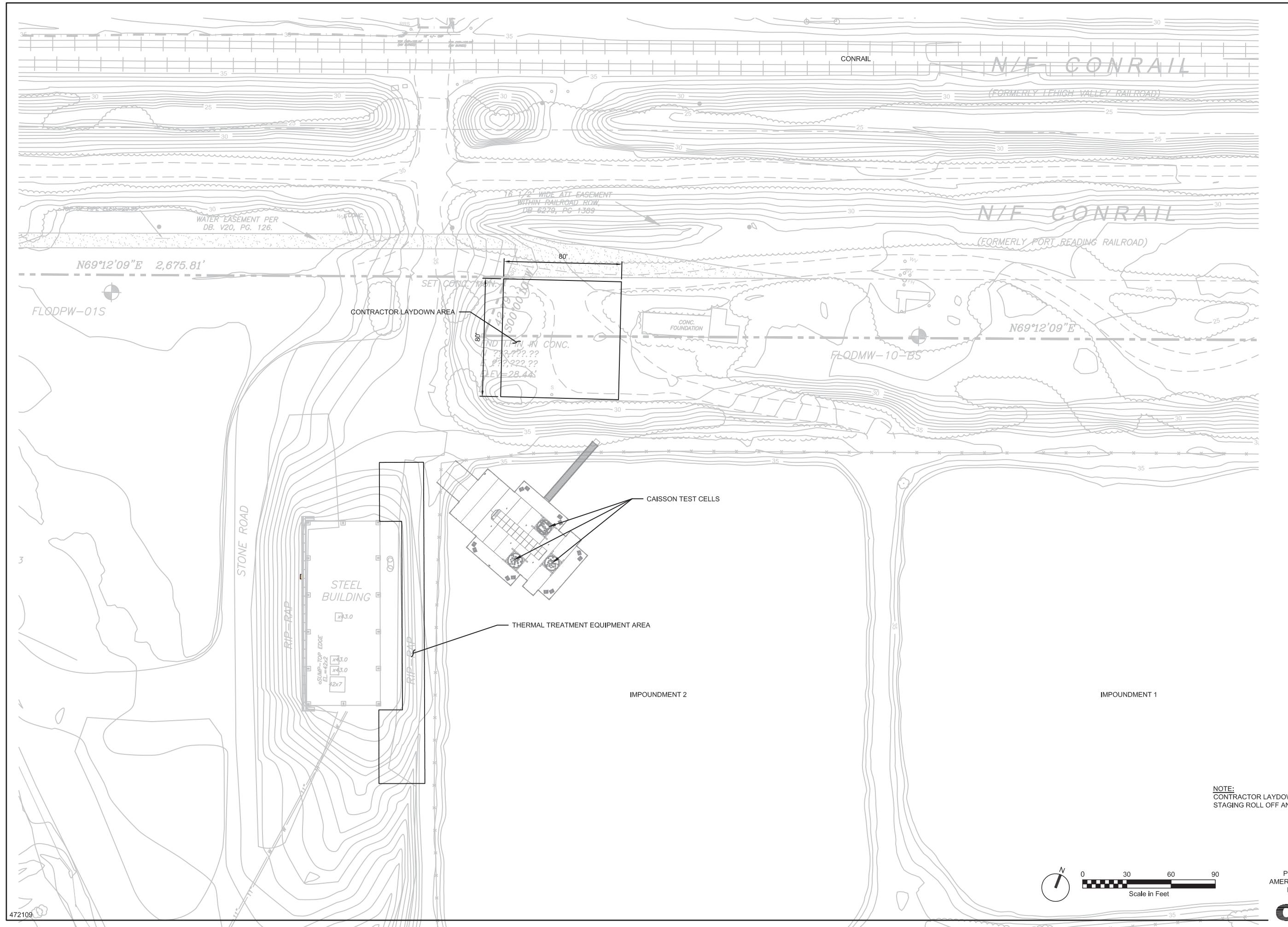
ISS = In-Situ Stabilization/Solidification

ISTT = In-Situ Thermal Treatment

S/S = Stabilization/Solidification (ex-situ)

VE = volatiles expanded causing material to expand becoming untestable.

## **Figures**



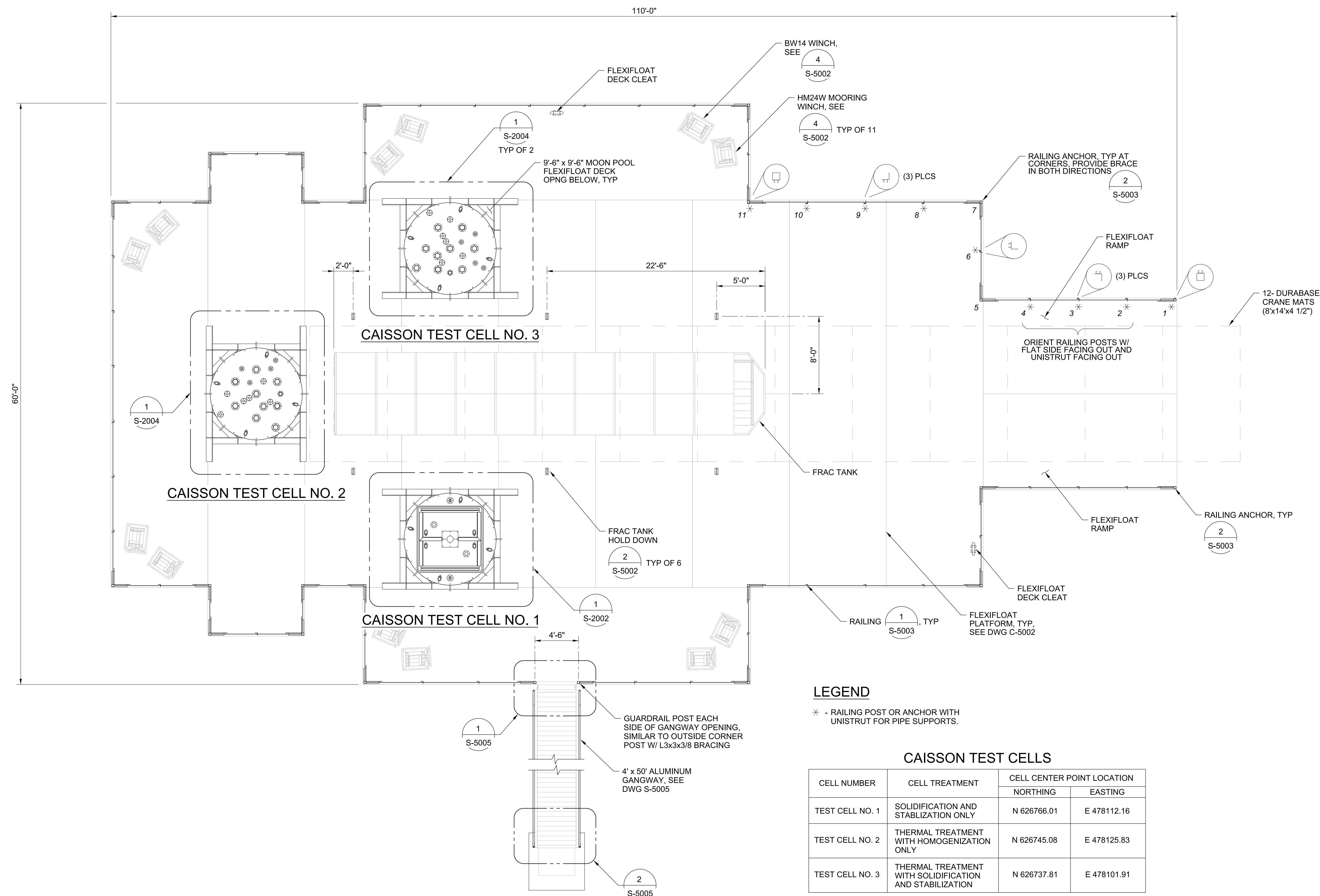
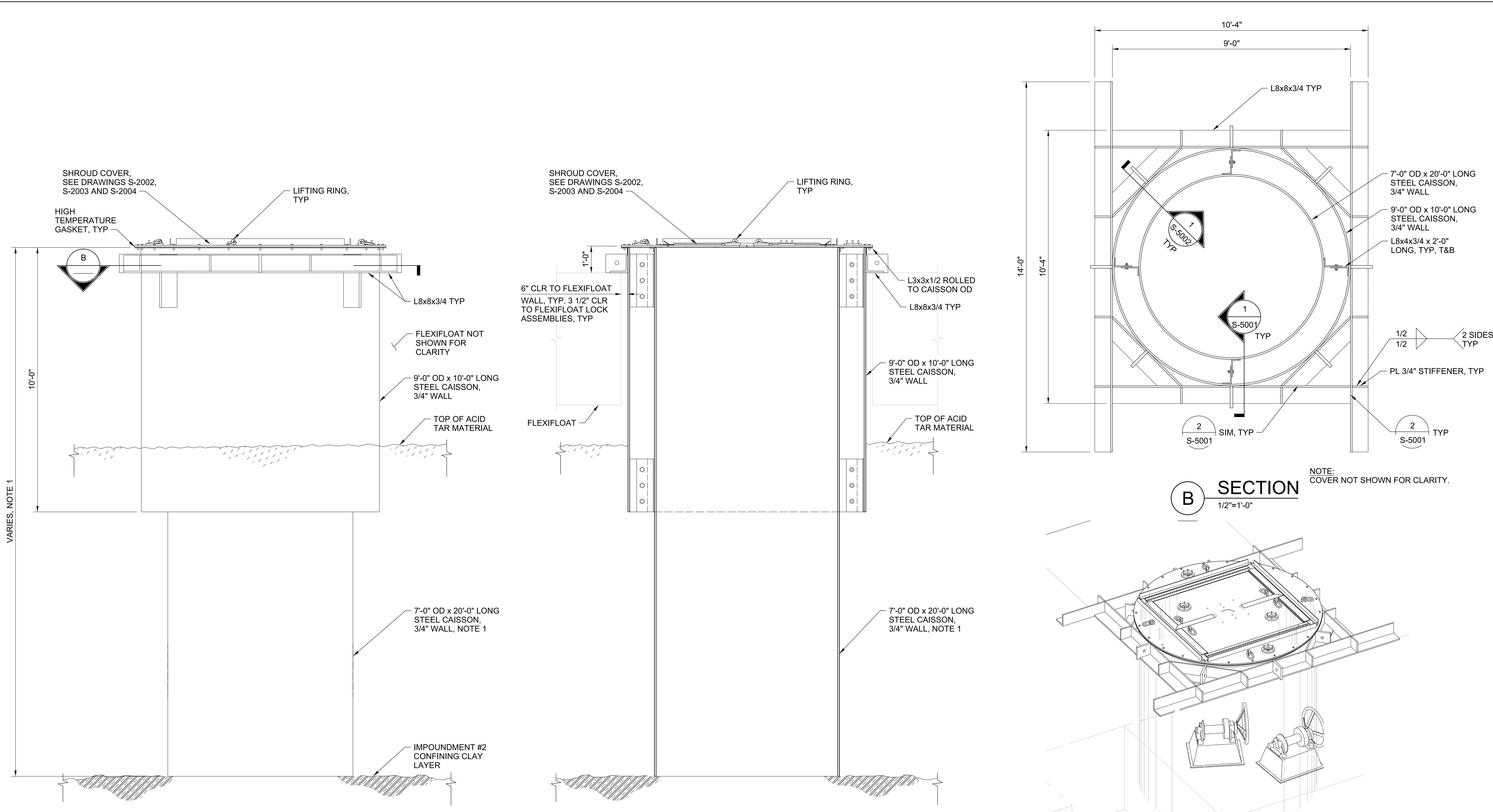


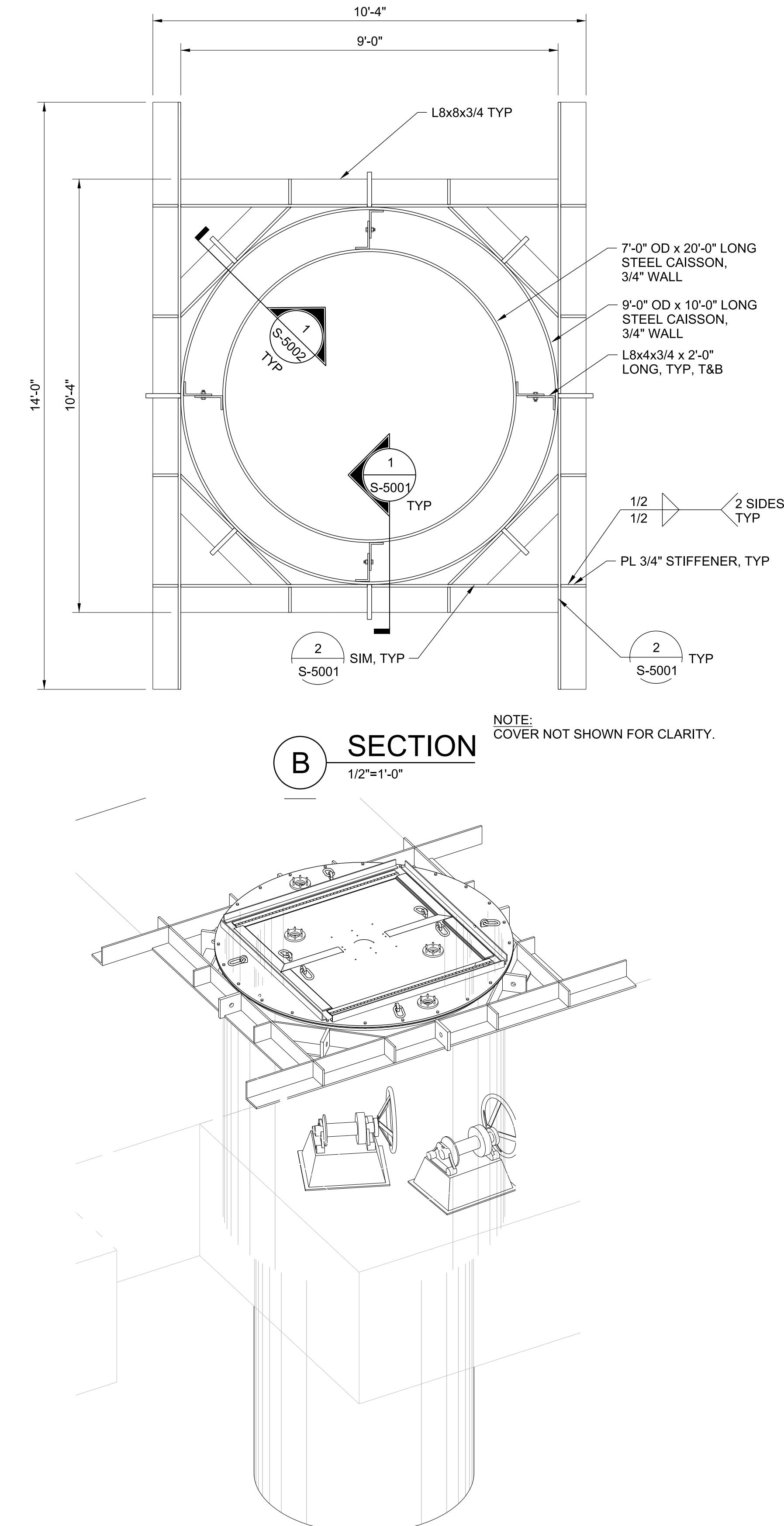
FIGURE 2  
OVERALL CAISSON PLAN

IMPOUNDMENTS 1 AND 2  
PILOT DEMONSTRATION STUDY  
OPERABLE UNIT 8  
AMERICAN CYANAMID SUPERFUND SITE  
BRIDGEWATER, NEW JERSEY

**CH2MHILL**

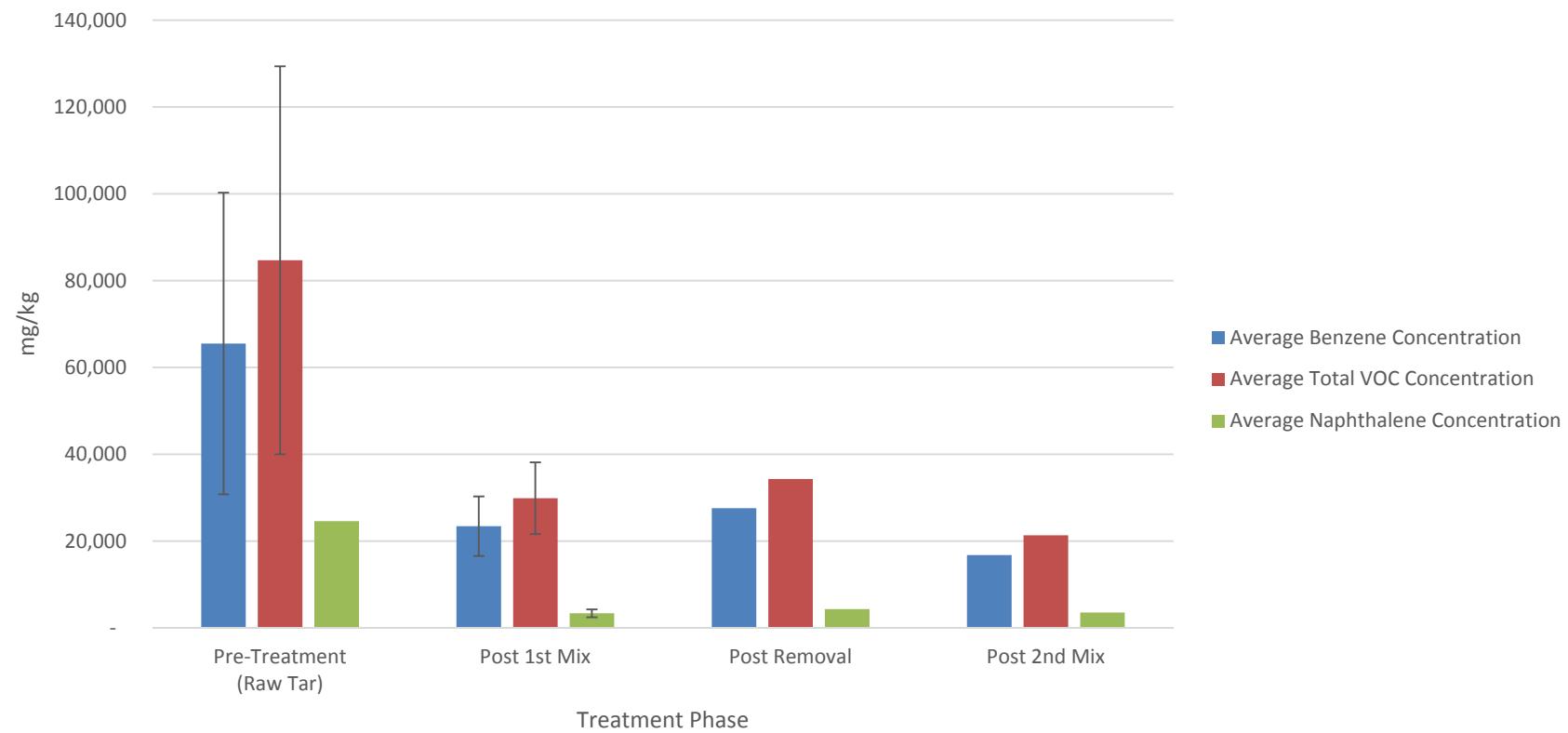


**CAISSON SHROUD ISOMETRIC**  
NTS

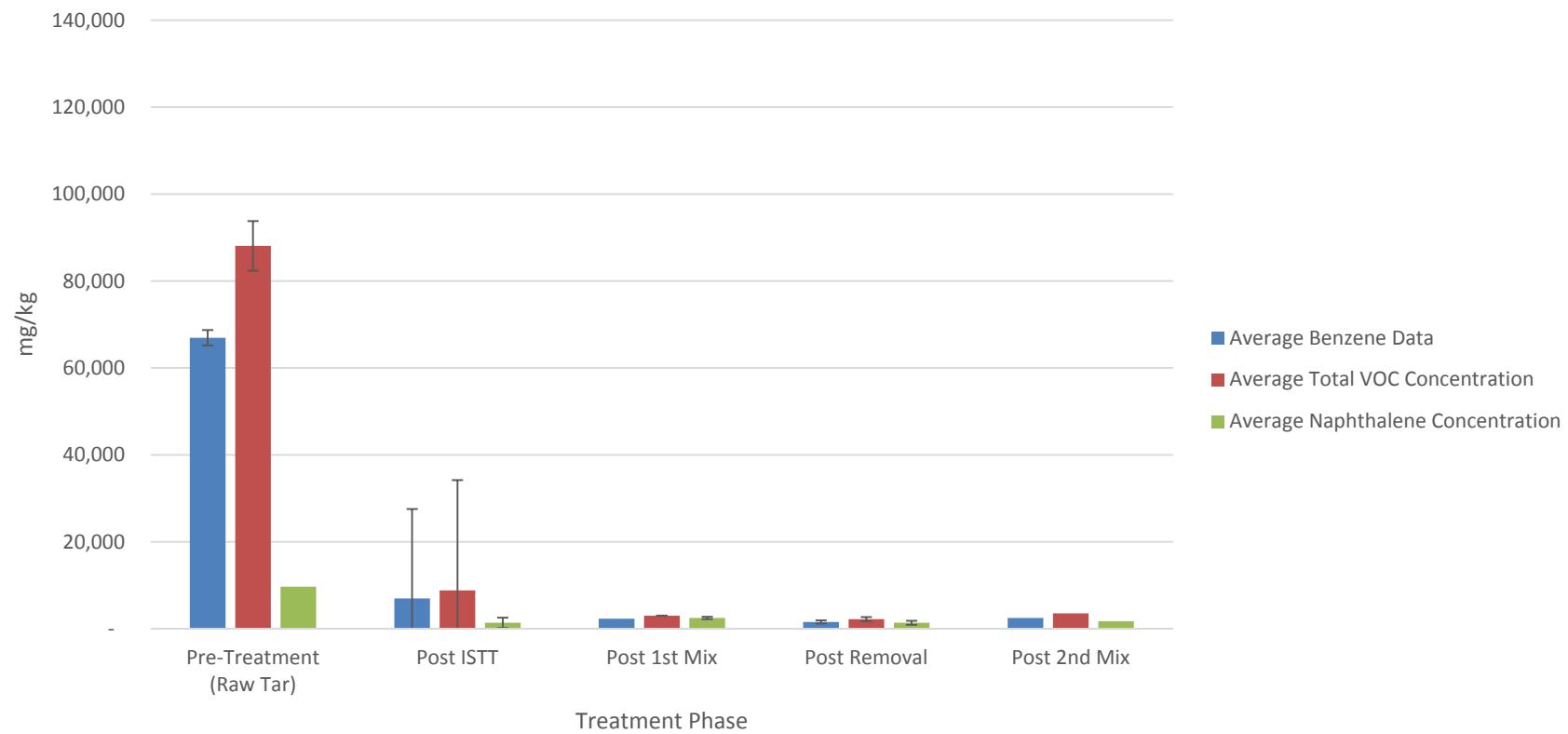


**FIGURE 3**  
**CAISSON ELEVATION, SECTION AND ISOMETRIC**  
**IMPOUNDMENTS 1 AND 2**  
**PILOT DEMONSTRATION STUDY**  
**OPERABLE UNIT 8**  
**AMERICAN CYANAMID SUPERFUND SITE**  
**BRIDGEWATER, NEW JERSEY**

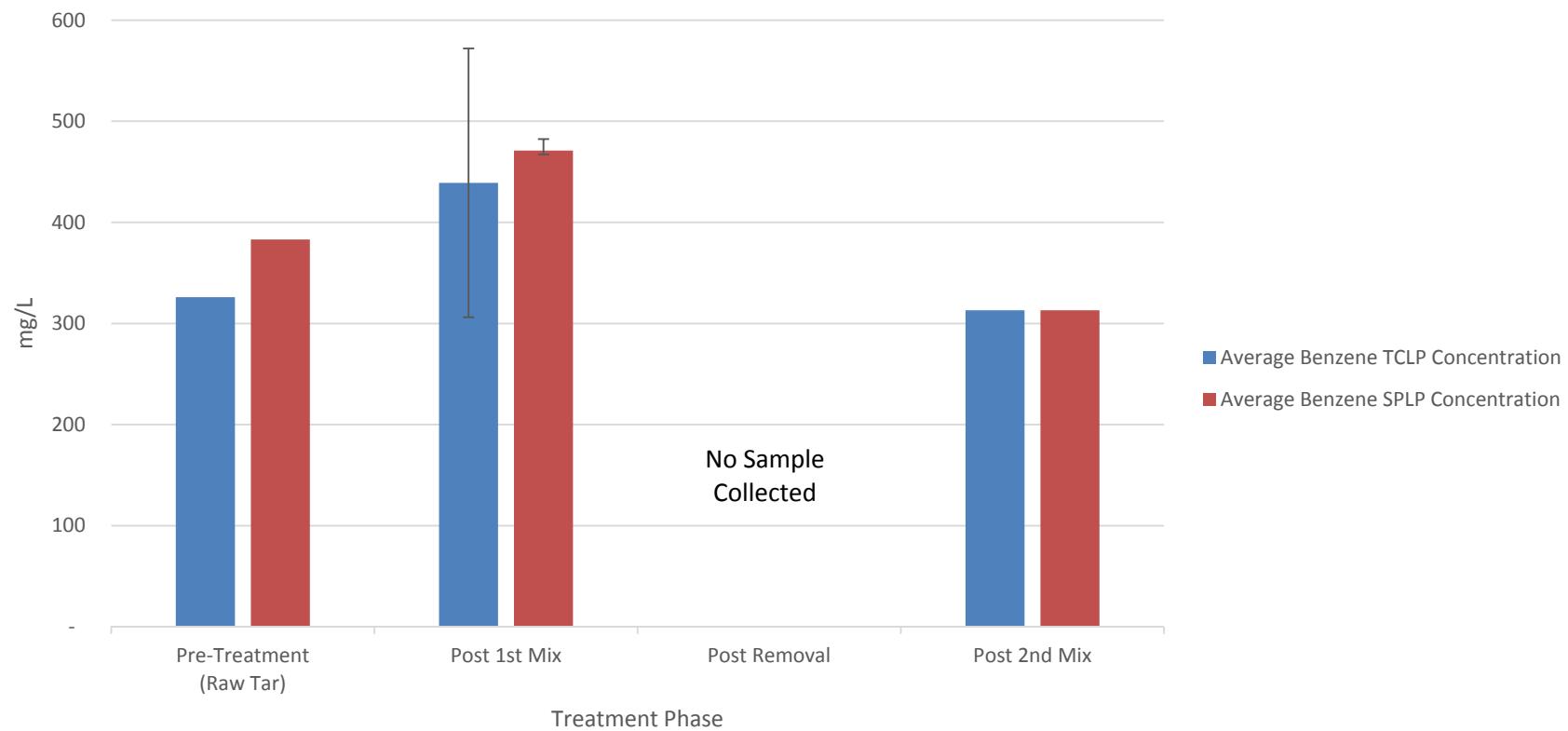
**Figure 4 - Caisson 1 (ISS Only) Constituent Concentrations**  
**OU 8 Pilot Study ISS Technical Memo**  
**American Cyanamid Superfund Site**  
**Bridgewater, NJ**



**Figure 5 - Caisson 3 (ISTT/ISS) Constituent Concentrations**  
**OU 8 Pilot Study ISS Technical Memo**  
**American Cyanamid Superfund Site**  
**Bridgewater, NJ**



**Figure 6 - Caisson 1 (ISS Only) TCLP & SPLP Benzene Concentrations**  
**OU 8 Pilot Study ISS Technical Memorandum**  
**American Cyanamid Superfund Site**  
**Bridgewater, NJ**



**Figure 7 - Caisson 3 (ISTT/ISS) TCLP & SPLP Benzene Concentrations**  
**OU 8 Pilot Study ISS Technical Memorandum**  
**American Cyanamid Superfund Site**  
**Bridgewater, NJ**

